Between Data Collection & Urban Planning: The Potential of Participatory Mapping in The Gambia

Mariama Bah

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ABSTRACT

Le but de cette étude est d'explorer si un travail de cartographie participative pour la collecte de données liées à la planification urbaine est plausible en Gambie. L'étude cherche à analyser cette question d'un point de vue institutionnel (gouvernement). Les questions suivantes guident cette étude : 1) la cartographie participative peut-elle être utilisée comme outil alternatif pour la collecte de données ? 2) cet outil a-t-il déjà été utilisé comme outil alternatif dans des communautés dans des pays en développement ? et cela a-t-il eu une influence sur la planification urbaine ? 3) est-il plausible d'adopter cette méthode comme outil alternatif pour la collecte de données liées à la planification urbaine en Gambie ? L'analyse de données de façon qualitative à un double objectif, d'abord de comprendre la perspective des participants, et ensuite de répondre à chaque question. Cette étude utilise une procédure en trois temps décrite par Miles et Huberman (1994) pour interpréter les données et pour des raisons organisationnelles. La procédure en trois temps comprend collecter les données, afficher les données et tirer des conclusions et les vérifier.

Deux études de cas sont présentées afin de montrer des exemples d'utilisation de cartographie participative dans des pays en développement, comme outil de collecte de données liées à la planification urbaine. Puis, huit représentants du gouvernement Gambien ont participé en répondant à un questionnaire. Les données du questionnaire sont retranscrites et analysées pour faire apparaître des thèmes. L'analyse de documents, les études de cas et le questionnaire sont utilisés pour définir des catégories et pour générer des thèmes. Les catégories qui sont apparues sont les suivantes : 1) la sensibilisation au sujet 2) le transfert de connaissances 3) le coût. Ces catégories sont analysées et les résultats sont ensuite commentés.
Une analyse des résultats a permis de faire apparaître les thèmes suivants : 1) capacité institutionnelle 2) déficit de connaissances 3) profile urbain 4) profile des risques 5) fonctionnalité.

La conclusion de l'étude offre un commentaire des résultats, ainsi que des recommandations pour la recherche et la pratique. Des suggestions sont faites pour considérer la cartographie participative comme un outil alternatif de collecte de données, qui pourrait compléter les approches standard pour la planification urbaine.

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CHAPTER 1. INTRODUCTION

BACKGROUND

For the first time in history more than half the world's population live in cities and over 90 percent of this urban growth is occurring in the developing world. During the next two decades, the urban population of the world's two poorest regions- South Asia and Sub-Saharan Africa is expected to double. [1]

Thus poverty exists not only in the rural sphere but increasingly spreading in the urban areas. According to the UN habitat, urban poverty extends beyond inadequate income and involves multiple other factors such as - inadequate asset base, shelter and provision of public infrastructure, as well as inadequate access to social services (health care, schools, vocational training etc.). Currently, in the sphere of international development, the United Nations Millennium Development Goals (MDG's) has an objective (target 7D), to achieve a significant improvement in the lives of at least 100 million slum dwellers, by 2020. [2]

Based on these factors, tackling poverty in urban areas through planning is much more complex and multifaceted. Today the scope of urban planning extends far beyond land use planning and designing settlements. The field is concerned with environmental sustainability, climate change, fiscal sustainability, good governance, and comprehensive urban development to give a few examples. The scope further widens to sustainable urban development, which encompasses city design, footprint impact, growth control through effective planning and land use, social inequality and uneven distribution of urban services, urban transportation network efficiency, economic competitiveness, and public safety. So with urban population rapidly growing, giving rise to urban poverty coupled with urban development issues becoming more complex; one can see that there are many challenges within this field especially in developing countries.

These issues do not exclude Gambia, the smallest country in Sub- Saharan Africa. The tiny country almost completely surrounded by Senegal, has a population of 1.8

[1] http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTURBANDEVELOPMENT/EXTURBANPOVERTY/0,,contentMDK:20227679~menuPK:7173704~pagePK:148956~piPK:216618~theSitePK:341325,00.html

[2] http://www.un.org/millenniumgoals/environ.shtml (Fainstein, 2014)

million. [3] The country has one of the fastest growing urban populations in Africa. Unprecedented growth has pressurized the provision of social services in urban areas with the consequence of raising susceptibility to urban poverty. In 2012, the urban population stood at 57.9% of the total population with an average annual growth rate of 3.6%. [4] This increase could be attributed to better employment opportunities both formal and informal in the urban areas. The capital city Banjul and its surroundings (the Kombos) constitute about 51% of the country's total population. Furthermore, these communities in the Kombos (KMC) are also highly vulnerable and susceptible to climate change risks, such as floods. The distribution of poverty by area shows that poverty averaged 57.2 % in urban areas and 63.3% in rural areas.[5]

With urban poverty growing, states like The Gambia have a lot of challenges dealing with informal communities because of their status. More than that, it is even more complicated for planners to have an impact in such places because the infrastructures are weak or at times invisible; and the resources tend not to be understood. This creates a problem for basic planning or any intervention to occur. To top that, we know from various case studies that many slum-upgrading projects don't work. Their failure lies partly on a) the lack of information /data and b) missing the "voice of the people"/participation.

For Gambia, despite establishing the Gambia Bureau of Statistics, which has aided in the availability of data through census and other studies, the issue (availability of data) however still remains, especially for spatial data. When it comes to national development of course with urban planning in mind, the overarching challenges according to the analysis in the UN- Habitat country profile were characterized as the following. There is an inadequate human resource base, the poor remuneration scale is leading to high attrition rates within the civil service, there is no standard definition concerning housing with number of persons per square meter, the last urban development management project, grand in scale, was in 1984, in addition there are neither slum mapping activities nor supporting figures on the slum population. Moreover, the master plan was last updated in 1989, making it outdated and establishing a need for it to be updated and done so on a regular basis.[6]

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[3] http://www.bbc.com/news/world-africa-13378351

[4] https://data.un.org/CountryProfile.aspx?crName=Gambia

[5] UN-Habitat, Gambia Urban Profile, 2011

[6] UN-Habitat, Gambia Urban Profile, 2011

Currently, there are various ways one can collect data for development planning. Apart from standard approaches towards data collection such as census, surveys, GIS mapping, etcetera; there are alternate methodologies emerging some of which are participatory and citizen driven in nature. One of the practices that has been utilized in many developing countries over the recent years is participatory mapping. To briefly explain, participatory mapping is an interactive approach that draws on local people's knowledge, enabling participants to create visual and non-visual data to explore social problems, opportunities and questions. It can also be used for non-spatial purposes, as a research tool for exploring social relationships (for example through mind maps and mapping social networks) and eliciting data from research participants.[7]

It can also be considered a tool and there are various forms and approaches within the field itself. Also depending on the cause, the tool can be used to address various issues. The information that can be gathered has a wide range for example; physical and social geography, household size/ income, demography, customary land boundaries, traditional natural resource management practices, sacred areas residents' personal or collective experiences, their attitudes or perspectives on their environment etcetera.

DEFINITION OF TERMS AND CONCEPTS

For this study, the following definitions have been taken into account however it must be stated that other definitions exist in various academic realms pertaining to the same word or action being described but were however not suitable/specific for this case.

- Urban planning – Planning, design and regulation of the uses of space that focus on the physical form, economic functions, and social impacts of the urban environment and on the location of different activities within it (Fainstein, 2014).
- Cartography - It is the art, science and technology of map making (International Cartographic Association, 1995).

[7] http://pathwaysthroughparticipation.org.uk/wp-content/uploads/2009/09/Using-participatory-mapping-to-explore-participation-in-three-communities_June-2010.pdf, pg. 1

- Counter mapping - Nancy Peluso introduced the term "counter-mapping" to geography journals to describe mapping practices by indigenous people in Kalimantan, Indonesia as they made maps to contest Indonesian state land-use plans (1995). The concept of counter-mapping not only resonated with indigenous mapping but also with the then emerging GIS and society and critical GIS literature (Dalton & Mason-Deese, 2012).
- Participatory mapping - Also called community-based mapping is a general term used to define a set of approaches and techniques that combines the tools of modern cartography with participatory methods to represent the spatial knowledge of local communities.[8]
- Community mapping - Is the entire spectrum of maps created to support social and economic change at the community level. From low-tech, hand-drawn paper maps to high-tech, database driven, internet maps that are dynamic and interactive.[9]
- Ethno-cartography – When cartography is married to anthropology and sociology to create ethno mapping, a practice by which human history and knowledge can be portrayed as a map. Also referred to as cultural/ social mapping[10]
- Participatory GIS – Integrating participatory methods while using Geographic Information System (GIS) technology.

STATEMENT OF THE PROBLEM

Given this, the problem concerning data for urban development is highlighted. With an increase in illegal and squatter settlements, accompanied by the urbanization of poverty, it is imperative that if any action is to be taken a true diagnosis of communities is required. This diagnosis can only be attained if there is enough data (both spatial and non-spatial) to guide the planning process and overall socio-economic development. As aforementioned, having adequate data within government institutions in Gambia is still a problem.

[8] http://www.mappingforrights.org/participatory_mapping
[9] http://groundtruth.in/2012/07/16/community-mapping-frequently-asked-questions/
[10] http://www.gislounge.com/what-is-ethno-mapping/

PURPOSE OF THE STUDY

- This study (1) investigated participatory mapping as a tool and how is has been utilized, (2) explored its potential as an alternate data collection tool for urban planning processes.
- The study sought to extend the literature on participatory mapping practices, particularly for urban planning in developing countries, by considering its adoptability for data collection in the Gambia.

In order to investigate if adopting participatory mapping for data collection related to urban planning is plausible in Gambia, I relied on the research questions that are stated explicitly in the following section.

Research Questions

The following research questions were investigated and guided this study:

1. Can participatory mapping can be used as an alternate data collection tool?
2. Has it been utilized within communities in developing countries as an alternate data collection tool, which in turn influenced urban planning processes?
3. Is it plausible to adopt it as an alternative data collection tool for urban planning purposes in the Gambia?

SIGNIFICANCE OF THE STUDY

The information presented in this study could be utilized for future research concerning participatory mapping practices and its potential in Gambia. It could serve as a backdrop for a PhD research investigating community members and non-governmental perspectives regarding this tool. Or perhaps focused on what specific types of participatory mapping practices (paper maps, Participatory GIS etc.) can be employed in Gambia. And develop a framework for its implementation and mainstreaming. Similarly, development agencies or NGO's interested in pioneering a pilot study in Gambia could use this research to compliment their background studies. More so, I believe this research could be of benefit to all government ministries and departments dealing with planning issues for example Ministry of Local Government and Lands, Department of Physical Planning & Housing, Ministry of Works, Construction & Infrastructure, Consultants (both local and international), Ministry of

Finances' Department of Planning, Policy Analysis Unit (office of the President), and of course the Gambia Bureau of Statistics.

SCOPE AND LIMITATIONS

There is an academic gap in the use of participatory mapping as a data collection tool to address urban planning processes.
The study is primarily focused on the context and perspectives of government institutions. The optimal situation would have been to be able to do field work and collect primary data from community members and NGO's regarding their perspectives on this topic.
This research is also looking at the potential and the plausibility of participatory mapping to be adopted in Gambia. In other words, is there a need, an interest from government institutions and an overall benefit for such a tool to be adopted. Other aspects such its implementation capacity and mainstreaming framework are beyond the scope of this research.

DESCRIPTION OF THESIS CHAPTERS

This dissertation was organized into five chapters.
Chapter one, the Introduction, provided an overview of the components of the proposed study. This included the development of context by providing background information and a summary of the topic of interest. The purpose of the study, the explicit statement of the problem addressed, the research questions and the significance of the results were also outlined.
Chapter Two, the Literature Review, was organized into three broad categories which included an analysis of published information relevant to (a) maps and participatory mapping (b) the applicability of participatory mapping and (c) its criticisms and challenges. Collectively, this information aided in providing the necessary context from which this study was conceptualized. A review of relevant literature in each of these broad categories was critically analyzed to permit inclusion of only that information which directly related to the proposed study.
Chapter Three, Research Design and Methodology, depicted in detail those methods and procedures that comprise the research protocol utilized for the study.

Detailed statements presenting the research questions addressed in the study were offered, followed by a comprehensive research plan. This research plan introduced the overall research design protocol. Then, an in-depth explanation of the research plan was provided. A detailed protocol addressing sampling procedures, participant selection, data collection and analysis procedures, as well as issues related to the reliability, validity, and trustworthiness of findings were specified.

Chapter Four was dedicated to presenting qualitative data analysis and results. Analysis of the data collected was done in twofold. First the two selected case studies were presented having used document analysis as the method of inquiry for research questions number 1 & 2. The second part presents findings and analysis from the questionnaire and documents reviewed using graphs, tables and themes in an effort to learn about the participants' perspectives and the institutional context as they related to the topic of interest.

Chapter Five, the final chapter included in this dissertation, was dedicated to discussion and conclusions as they pertained to the results of the research. Particular attention was given to a discussion of the findings in an effort to establish the trustworthiness of conclusions.

Also a summary of the purpose of the study, results and conclusions, and the significance of the study were offered. Attention was given to addressing the implications of this research for relevant audiences, as well as providing suggestions for future research on the topic of interest in this study.

CHAPTER 2. REVIEW OF THE LITERATUE

"Maps are more than pieces of paper. They are stories, conversations, lives and songs lived out in a place and are inseparable from the political and cultural contexts in which they are used" (Rambaldi, 2005).

INTRODUCTION

The trends in critical cartography seemingly indicate that there is a growing recognition of the value of perspectives drawn from social science and cultural studies disciplines and so we are left to ponder upon how might we negotiate the theoretical reorientations towards geography and cartography? To over simplify, we can track the complementary disciplinary trajectories represented by, on the one hand, the 'cultural turn' in the spatial disciplines of geography and cartography, and, on the other, the so-called 'spatial turn' in the social and cultural disciplines. Neither of these reorientations is entirely presenting a complete epistemological shift in direction; but what they do hint at is a discursive middle ground in which ideas of 'maps' and 'mapping' are increasingly called upon to act as rhetorical devices to address sociocultural concerns that are in some way deemed to be 'spatial' or vice versa. The trends also indicate the uptake of interest in maps and mapping by scholars in film and literary studies, art and visual culture, anthropology, cultural studies, marketing, museum studies, architecture, and popular music studies. This growth in popularity can perhaps be attributed to the impacts of the prevalent 'spatial turn' that has left its mark on the social sciences and humanities (Roberts, 2012, pp. 10-12).

Cartography can be defined as representation of spatial reality to humans. With this, cartographic theory focuses on the numerous relations between representation i.e. map, user and reality.[11] The multidisciplinary interests in this field provide an arena towards widespread popular engagement in local mapping cultures. These cultures illustrate a shift away from the idea of the map as a disciplinary apparatus of, variously, the state, the global military-industrial complex, multinational corporations, scientists and technocrats towards more open and agential forms of engaged mapping practice. This exhibits a shift in agency and such there has been a

[11] http://meta-carto-semiotics.org

growing recognition of the need to reclaim the map – and the practice of mapping – from the cartographers. In the end, calling for the need to reclaim the analysis of maps and mapping practices from cartographic theory.

The concept of participatory mapping encapsulates this shift in the culture of mapping and agency of maps. It is all about reclaiming the process – mapping practice and the product – the map.

In this section the term participatory mapping will be broadly discussed and analyzed. Drawing from diverse literature concerning the topic at hand, a brief history will be touched upon in the introductory section. It is important that before such a topic as participatory mapping is delved into; it might be beneficial to understand what maps are and why they are important to begin with. This serves as backdrop to understand such a topic like mine that has everything to do with maps. Following the history of maps, the notion of participatory mapping will be discussed starting with what is and its history. In the second section, its applicability as a tool will be treated looking at the general context, followed by its usage in both developed and developing countries. With this, the third section will be an analysis of the practice, which will be gauged through debates presented in the literature review. It will examine challenges, criticisms, and its consequences both intended and unintended. The last section will be conclusions drawn on the widespread phenomenon of participatory mapping.

BRIEF HISTORY OF MAPS

It is important to explore what maps are and what maps do prior to discussing the implications of when cartographers draw maps of, and even with, indigenous and local communities as in the case of participatory mapping. Maps are always made for a purpose and maps are representational objects closely implicated in projects of place making and therefore they are tools of power. The late historical geographer J.B. Harley asserted that,

"Maps are inherently ideological representations that reflect the social contexts and interests of their creators. Cartography, the science or practice of drawing maps, is a social practice used to reproduce dominant world views, and that claims to mimesis provide the map with its rhetorical power." (Harley, 1988,1989,1990,1992 as cited in Sletto, 2009, p. 445).

The cartography theoretical work developed in the 1980s by scholars such as Harley and Denis Wood marked the beginnings of a shift in thinking towards critical acknowledgement of the socially constructed and power-laden nature of maps. In Harley's seminal essay 'Maps, Knowledge and Power' (1988), Harley makes explicit the need for engagement with other disciplinary perspectives and recognition of the deeply historicized, political and cultural contexts within which practices of cartography are framed. In so doing he challenged positivistic assertions of an abstract and ahistorical cartography founded on enlightenment principles of reason and scientific neutrality:

"While theoretical insights may be derived, for example, from literary criticism, art history, and sociology, we still have to grapple with maps as unique systems of signs, whose codes may be at once iconic, linguistic, numerical, and temporal, and as a spatial form of knowledge… Through both their content and their modes of representation, the making and using of maps has been pervaded by ideology." (Harley, 2001 as cited in Roberts 2012, p.12)

Cartography, is believed to have played a role in early state building, had a purpose during the colonial project, and was used in the orientalization of indigenous and native peoples. Its character also extends to the domineering role of geographic information systems (GIS) and remote sensing in excluding alternative spatialities in development, conservation and urban planning.

Allow me to briefly note the importance of GIS when discussing participatory mapping. GIS (Geographic Information Systems) is a computer-based system increasingly used in planning, resource management and many other activities, which involve map- making. However unlike mapping software, which only draws maps, GIS enables complex spatial analysis. The European Commission has estimated that 6–7 per cent of the GDP of Western nations – 800 billion in the European Union alone – is dependent on global navigation satellite systems (GNSS). The most widely used GNSS- GPS (Global Positioning System); has long been considered a technology that compliments GIS operations, and is now a vital technological component of data networks, financial systems, shipping and air transport systems, agriculture, railways and emergency services. The specificities of distinct mapping or machines of geospatial technocracy are not of relevance here, but rather the significance they carry pertaining to the agency of maps and of mapping practices (Roberts, 2012, pp. 2-3).

PARTICIPATORY MAPPING

After a minute history of maps yet essential to fully grasp the broad spectrum of this topic, it is now suitable to decipher the topic at hand, participatory mapping. If the pendulum shift in the agency of mapping has started to swing in a more democratized direction then it should also be noted that counter-cultures of mapping or rather mapping cultures that deviate in some way from the Cartesian model of cartographic rationality are not exactly new. There are practices and traditions of indigenous mapping cultures, both Western and non-Western, pre-modern and modern, all in their different ways, which are testament to the downright refusal of maps and mapping practices to conform to the limitations of cartographic convention. Historic accounts testify well developed map making skills of the aboriginal societies and in ancient times namely Inca- Peru and Zapata – Mexico and so this is not necessarily that emergent (Kosek, 1998, p. 4). Indigenous spatial perception and representation highly influenced the colonial enterprise. Local populations have shared their spatial knowledge to help conquerors, explorers and researchers draw maps of their lands (Herlihy & Knapp, 2003, p. 303).

It is precisely because of the power of maps to support hegemonic symbolic and material practices that today indigenous peoples, residents of marginalized urban neighborhoods and other subordinate groups draw on the rhetorical power of maps to represent alternative world views and futures. As aforementioned, an interest in the power of maps has emerged also amongst developers, environmentalists, human rights activists and researchers.

Various terms ethno-cartography, indigenous mapping, cultural/ social mapping, community-based mapping, power mapping, remapping or as Nancy Peluso in 1995 coined the term “counter mapping” are said to represent indigenous interests and conceptions of landscapes. This is conceived with the hope that it will represent an alternative and more democratic decision-making process of thinking about and producing landscapes. Generally captured as participatory mapping, according to Herlihy and Knapp (2003) this is a blend of participatory research methods and western style maps as tools of empowerment. It recognizes the cognitive spatial and environmental knowledge of local peoples and transforms this into more conventional forms, in this case a map, be it paper, 3D model or computer based. It is a new way

of community-based cartography that challenges long-standing positivistic institutional ideals about producing geographic information. Thus the practice has ties to social action and justice (Sletto 2009, p.445).

Looking closer at the term participatory mapping, it will be beneficial to expand the discussion and shed some light on participatory research and how this social science methodology came about. This notion was conceptualized in Tanzania during the 1970's to challenge development experts, policy makers and other researchers to recognize the knowledge of the local peoples and to put them first in development and research agenda. It is an alternative way to produce scientific knowledge that decentralizes the process and puts it in the hands of the people. As a result, significantly breaking down the researcher – researched, subject- object dichotomy of knowledge production.

Participatory research consists of two approaches. The first approach is participant observation, where the researcher lives in a community and participates in daily life while observing and collecting data, using questionnaires and interviews. The second approach is participation reached though collaborative research; where the researcher works with local people to apply research to meet the needs of the population (Herlihy & Knapp, 2003, p. 304). The process of participatory research revolves around the exchange between community representative and participatory researchers. Community representatives called "surveyors, local researches and local knowledge specialists" and work with the researchers directly. The participatory researchers called "facilitators, technical assistants or investigators" help locals articulate their objectives into an appropriate research design (Ibid). It is a process informed by both top- down and bottom –up approaches, and thus allows the use of diverse research techniques – mapping in this context – to deal with various real world problems as perceived by the people experiencing them. To be more specific participation action research (PAR) stands out by its use of the methodology to meet social need (Ibid, 2003, p. 305). Lastly, another version of participatory research in development studies is participatory rural appraisal (PRA). It is distinctive from the previously mentioned participatory research types in that the outside researchers or development experts act as facilitators, who allow for the free- flowing development of the methodology and the design of the research.

Participatory mapping is an umbrella label that refers to an array of community-based research and development approaches utilizing local people to draw

maps. It is defined as a methodology that recognizes the cognitive spatial and environmental knowledge of local people and transforms this into conventional forms namely - map, graphic or written forms. The notion of participation is presumed by giving administrative responsibilities to community representatives. These representatives are trained and do parts of the research or applied work often in collaboration with NGO's, state institutions, federations or other organizations. The methodology combines participatory research and cognitive mapping. Overall this fuses spatial and environmental knowledge with technical understanding of cartography. The noun cognitive map is defined in Oxford dictionary as a mental representation of one's physical environment. For example, when a friend asks you for directions to your house, you are able to create an image in your mind of the roads, places to turn, landmarks, and so on, along the way to your house from your friend's starting point. This representation is the cognitive map.

Like participatory research, participatory mapping has two variants, one focusing on social action and the other on research. Participatory action research mapping (PARM) links research with action to meet social needs. PARM is useful for understanding the geographical layout of settlements and resources, however is not focused on producing conventional maps per say, rather giving communities a way to assess environmental or social concerns. The other variant, participatory research mapping (PRM) applies the participatory methodology to make standard maps and descriptive information. It can take the form of maps made on the ground and/ or redrawn on paper, or of overlays on aerial photography (Abbot, et al., 1998, p. 31). Social issues can be objectives of PRM, but intercultural communication, western style accuracy, validity and standardization of the results is essential in PRM. It focuses as much on the technical aspects of the mapmaking process as on the cultural context in which it occurs.

In short, participatory mapping provides a new tool for understanding human versus environment relationships. It conveys knowledge beginning with cognitive mental constructs, followed by converting these to consensual images and then finally into conventional maps or descriptive forms. It is progressive in that geographic knowledge is build at various scales, from the individual to the community, to regional and then the state level.

APPLICABILITY: GENERAL CONTEXT

Whilst participatory mapping still primarily refers to indigenous cartographic efforts, it is increasingly being applied to non-indigenous mapping initiatives in economically developed countries. Such counter-mapping efforts have been facilitated by the process of neoliberalism, and the democratization of technology. With the spread, thousands of maps have been made. Today, there are innumerable examples of participatory mapping for example it could be used for land use or resource planning and management, identifying tenure and rights, and resolving conflicts. To name a few uses especially ones where governments have shown a lot of interests.

Participatory spatial mapping has been used for a range of other purposes, which can be complimentary for natural resource management or indigenous cultural knowledge. Here are a few examples where this is portrayed. Social mapping - identifying people, livestock, social categories, wealth, children attending school. Mobility mapping – who goes where for what and how often. Water and sanitation mapping - for example mapping areas of open defecation was key for the community-led sanitation movement in Bangladesh, Cambodia, India, Indonesia, Mongolia, Nepal. Prevention of crime – identification of locations of molestation, assault or rape; and degree of risk in villages in South Africa and Tanzania. It could also catalyze changes in policy and management or even generate and influence statistics (Chambers 2006:4). The power of counter-maps- which can be viewed as a form of participatory mapping- to advocate policy change in a bottom- up manner has led to some authors arguing that counter-mapping should be viewed as a tool of governance.

In addition, Robert Chambers, who is prominent in this field, did a quick analysis concerning the two common media people use to map – paper versus ground maps. However, this is not to discredit or portray that people are not employing other powerful techniques such as participatory 3D modeling. Below I produce the table.

Relative Advantages and Disadvantages of Ground and Paper participatory maps

Ground Maps	Paper Maps
More temporary, cannot keep, exposed to animals or people trampling, rain, wind…	More permanent, can store safely but also vulnerable to water, mould, tearing, burning…
Familiar and comfortable for many	Unfamiliar and inhibiting for many
Easy to alter, add to, build up, extend	Committing, harder to alter, build up or extend
More democratic, many can hold the stick, less eye contact, less verbal dominance	More exclusive, one, educated often hold the pen, presenting own more than group view
Freely creative with local materials	More restrained, with materials from outside
Locally owned, outsiders cannot remove[7]	Vulnerable to removal by outsiders
Cannot be used for monitoring	Can be used for monitoring, with updating
Not convincing or usable with officials	Can empower when presented to officials
More crosschecking and triangulation	Less crosschecking, fewer may see
Power and ownership more dispersed	Power and ownership more concentrated

(Chambers, 2006, p.5)

PARTICIPATORY MAPPING IN DEVELOPED COUNTRIES

To extend beyond ground and paper maps, I now draw attention to developed countries where participatory mapping may utilize the aforementioned or other media for diverse purposes. In this case the purposes can be categorized as both PRM and PARM, which the takes place in urban contexts.

Regarding this, the first person to come to mind when the thoughts of urbanity and participatory mapping merge, is the highly influential American urban planner Kevin Lynch. Rather than emphasize the traditional way we learn about our city, through professional maps and plans, Lynch focuses on how people in the city actually use and perceive their physical environment. His seminal work concerning cognitive mapping in 1960 resulted in his famous book *The Image of the City*. Lynch influenced the field of city planning through his work on the theory of city form, and studies relating to human perceptions of the city. Also, studies on the perception of the city environment and its consequences for city design. Lynch's core concept was the idea of the "legibility" of the built environment. That is, how easy can the parts of the cityscape be organized into a recognizable pattern. With the case studies he conducted in three U.S. cities: Boston, Los Angeles, and Jersey City, he used two primary methodologies. First, he conducted extensive fieldwork observing the

physical layout of the city. Then, in-depth interviews with city residents were conducted to better understand the mental/ cognitive image people have of their built environment. The way these cognitive images were transformed into sketch maps is central to the approach thus Lynch's process could be categorized as participatory research mapping. The result of his study identified five key elements that make up an individual's perception of their city: paths, edges, districts, nodes, and landmarks. In the end his work durably influenced the field of urban planning in the United States (Lynch, 1960).

The development of community maps in an urban context are also illustrated in the work of the charity, Common Ground based in the United Kingdom, whose influential project "Parish Maps" was first established in 1985. It is a bottom- up initiative encouraging local people to map elements of the environment valued by their parish and since then more than 2,500 English parishes have made such maps. Despite its long pedigree Parish maps have attracted little scholarly attention, however the Parish Map project is still strong in terms of the culture and values underpinning it.

In the founding director's, Sue Clifford, 1996 article " Places, People and Parish Maps" the argument is that increasingly maps are made from satellite recording and ground knowledge is regarded less precise, less useful and more costly, and so with each level of abstraction happening people feel less able to argue what they know. The project draws on and works with a wide range of media including collage, photography, video, textiles, ceramics, paint, drawing and sculpture (Roberts, 2012, p. 8). It could be seen as an early example of what Peluso termed as counter mapping, in that it questions the biases of cartographic conventions and challenges predominant power effects of mapping.

In the recent past, precisely 2004, another mapping project - open street map (OSM) was launched. It is an open source project to develop free geographic data, meaning it's a citizen led spatial data collection website. The process of map creation explicitly relies upon sharing and participation; consequently, every registered OSM user can edit any part of the map. In short, the OSM project can be seen to represent the aforementioned paradigm shift in who creates and shares geographic information - from the state, to society. However, rather than countering the state-dominated cartographic project, some commentators have affirmed that OSM merely replicates the 'old' socio-economic order. For instance critics affirm that OSM users in the

United Kingdom tend not to map council estates; consequently, middle-class areas are disproportionately mapped.[12] Nonetheless, this project is a huge success one could argue, as it did create change in mapping practices and currently it is utilized in many countries i.e. OSM France, OSM Libya to name a few.

PARTICIPATORY MAPPING IN DEVELOPING COUNTRIES: LATIN AMERICA

Its progressive nature at various scales synced with the need for better maps demonstrated by indigenous communities, it is not surprising that as a tool, participatory mapping's applicability can generally be witnessed in the context of developing countries. The indigenous lands of Latin America serve as an example where numerous counter-mapping activities occurred which could be categorized as participatory action research mapping (PARM) for indigenous land rights.

Native people in this region lived in areas with some of the poorest cartographic coverage, and even though standard topographic and political maps provided overviews at scales of 1:500,000 and 1: 250,000 they still lacked enough detail for research and development needs. Often the settlement and land use information is so incorrect or outdated that its value is limited. Government census maps should be reliable for updated settlement data; yet census workers are notorious for being unreliable when working in remote areas. This is reflected in official maps with blank spaces and misinformation (Herlihy & Knapp, 2003, p. 306).
Years later, indigenous organizations started to coordinate national level movement throughout Latin America. This overtime affected the international legal environment for example the International Labor Organization adopted conventions and recommendations to protect the rights of indigenous people in 1957. Later in 1989, the conventions and recommendations were updated, and finally ratified by Bolivia, Columba, Costa Rica, Guatemala, Honduras, Mexico, Paraguay and Peru. With this legal support including that of the Inter- American Court of Human Rights, the legal framework was reinforced as well as the use of participatory mapping in such a context.

[12] www.osmfoundation.org

Latin America's history plays an important role in counter mapping; when indigenous societies and social scientist worked and began to harness the powers of mapping in the 1990's. The importance of this cartographic depiction of indigenous populations became evident as research heavily analyzed the relationship between indigenous settlements, natural resources and conservation areas. In the end these communities embraced participatory research methods and western style maps as tools of empowerment, almost a cartographic revolution to map and gain control of their lands (Ibid: 307).

INTENDED CONSEQUENCES

Taking all of the above into account, it would not be unrealistic to assert that maps have intended consequences. In the same vein so do participatory maps. The most mentioned outcome is that participatory mapping serves as a tool to empower people. The information gathered can serve for advocacy purposes and be presented to government or policy –makers at a scale and in a form they find credible and usable (Abbot, et al., 1998, p. 29). Especially, as highlighted in Latin America to legitimize communities, in that they get legal recognition. Governments have shown interest in the approach because indigenous areas generally have poor cartographic coverage. So during a mapping process, authorities can address transforming these areas into zones or issues of land claim or tenure can be prioritized.

For Robert Chambers, mapping could also serve the purpose of information gathering to generate or influence statistics, as in the case of Malawi he featured in his article. The national census was carried out using participatory mapping to identify households, which led to raising the estimate for the rural population form 8.5 to 11.5 million (Chambers, Participatory Mapping and Geographic Information Systems: Whose Map? Who is Empowered and Who Disempowered? Who Gains and Who Loses? , 2006, p. 4).

LATENT CONSEQUENCES

Surely, mapping could be regarded as a simple tool with practical and political use that can aid communities' deal with global issues. It has emerged as a dominant paradigm in participatory approaches to international planning, conservation

management, and community development in the global south. It is also considered a technology with emancipatory potentials for subordinate or marginalized groups. As with everything, there are intended consequences but more often than recognized there are latent consequences that occur.

To begin one must be aware of the simple yet critical irony - not all participation is participatory- and levels of involvement vary greatly. There are strong and influential differences related to scale, media, mapping criteria, and level of participation. The forerunner in this field is Robert Chambers, who among many is highly concerned with how "participatory", participatory mapping is and the ethical issues concerned with this practice. In his book (Chambers, Ideas for Development, 2005), Chambers produces a more thorough treatment of participation as a spectrum that considers the objectives, the roles and relationships, the actions, and the ownership of the development process and the actors. Also, in his 2006 article concerning participatory mapping and GIS, he proposes an analysis - a participation ladder with roles and responsibilities. I have reproduced the table below.

		Roles/Relationships		Actions		
	Ousiders' objectives	Outsiders'	Local People's	Outsiders	Local People	Ownership
TOTALITARIAN	state political	dictator	slave	command	comply	outsiders'
NOMINAL	cosmetic legitimization	manipulator	puppet			
EXTRACTIVE	obtain local knowledge for better planning	research / planner	informant			
INDUCED	gain action through material incentives	employer	worker			
CONSULTATIVE	improve effectiveness and efficiency	rational economizer	collaborator			
PARTNERSHIP	share responsibility	co-equal partner	co-equal partner			
TRANSFORMATIVE	facilitate sustainable development by local people	facilitator / catalyst	analyst / actor / agent			
SELF-MOBILIZING	support spontaneous action	supporter	owner / controller	support	initiate	local people's

(Chambers, 2006, p. 9)

I find this table helpful in that it gives us something to reflect on, to see the gaps between most organizations' or donor agencies rhetoric and reality. It hints to the fact that most development practitioners have worked for organizations that aspire to be –

and talk as if they were – operating at a degree of participation at the 'partnership' or 'transformative' level. But, I suspect that most of these organizations actually operate somewhere between the nominal and consultative levels.

The title of Chambers article poses the questions, who is empowered and who is disempowered, who gains and who loses? To deal with ethical issues, a code of ethics was drafted to accentuate that all information has layers. Each layer requires different protection, some made into public while others kept confidential. As Chambers puts it, some of the abuses to be mindful of are as follows. From the onset, one has to be aware of taking peoples time. Poor peoples time, contrary to common professional belief is very precious, especially at difficult times of the year. For example a day of weeding lost at a critical time can have high hidden costs in a smaller harvest. Another issue to be aware of is the big risk of raising expectations. Any process of analysis facilitated by an outsider is liable to raise expectations of some benefit, even if the outsider explains that they have nothing to offer and nothing will follow from their visit. This can logically cause disappointment and reinforced disillusion with visitors and organizations outside the community. As practitioners, one has to be careful of extracting information only for the outsiders benefit without this being clear to those who provide it. The other three concerns Chambers highlights are; extracting information which will be used against the people, exposing people to danger and causing tensions or violence in a community. These concerns are shared by other authors and will be elaborated on further in this section (Chambers, 2006, pp. 6-7).

Participation is not holistic per say. There is a tendency for counter-mapping efforts to overlook the knowledge of women, minorities, and other vulnerable, disenfranchised groups. Or even increase uneven gender relations and other inequalities of power and access to resources in local communities (Sletto, 2009, pp. 443-446). From this perspective, counter-mapping is only empowering for a small subset of society, whilst others become further marginalized. Sletto showed an example where he was working in a participatory mapping project and was asked to prioritize elders – unremarkable given the respect for elders and their knowledge- to take the lead when drawing maps (Ibid, p. 453).

Coming back to the previously cited author Jake Kosek, I will now discuss how he contributed to the arguments and debate Chambers put forth. Kosek, scrutinizes the notion of community and how this relates to empowerment. He

contests the heavily relied-on notion of community as a category of people associated with a relatively fixed location. He argues that the process through which people are included or excluded (in other words empowered or disempowered) is fluid, and occurs at different times for any number of reasons, including as their class, race, gender and/or position within formal boundaries of the community (Kosek, 1998, p. 5). By broadening the scope for the definition of community, Kosek strengthens his argument that, the fluid notion of community can have an effect on counter mapping activities. Maps reflect and reproduce social relations, for example they can help fortify a dominant idea of who belongs within particular boundaries and who does not; who may make decisions on behalf of the community and who may not.
The author draws on personal experience to attest that mapping projects at times serve the interest of the more powerful members of a community, who would like to maintain the status- quo and overall have greater influence on the mapping process. According to him, the creation of counter maps should not ignore or reinforce the inequities, erasures, and exclusions, which inevitably exist within those groups.

To put forth another argument that also supports Chambers concerns the author Jeff Fox's 1998 article will be referred to. In *"Mapping The Commons: The Social Context of Spatial Information Technologies."* Fox examines the ability of mapping to empower people by drawing on examples of indigenous mapping projects that seek to give cartographic power to communities. He proclaims that by utilizing the cartographic technologies to gain power, indigenous people are "telling alternative spatial stories" (Fox, 1998, p. 3). He concludes his review with the idea that is it a fine line between cartographies and research practices that simply reproduce power relationships, and practices that actively challenge these relationships.
However Fox cautions that, while maps can be an empowering tool, they can also pose key challenges for communities. A map can help a local community define itself in relationship to the landscape and to the political forces that shape and influence it, but can also disinherit or de-legitimize their claims over the same landscape. Fox grounds his argument in the idea that while spatial information technology may enable local people to make claims against the state, this power comes with a price. By establishing boundaries through mapping, the nature of their traditional perimeters which are fluid and flexible is lost (Fox, 1998, p. 4).

Chambers also singles out the latent consequence of map-making to trigger conflict within communities. This is a common ground where both Fox and Kosek

share their concern. Jeff Fox strongly argues that this reality should not be underestimated stating that, when mind maps which are fluid and flexible in nature get transformed into paper maps, borders are defined and thus specific land rights between villages arise. Kosek further elaborates Fox's argument pertaining to conflict, stating that researchers and NGO's infrequently acknowledge their own involvement in the creation of the conditions for these conflicts. His analysis of the context is that stakeholders (NGO's and researchers) general role, as well as their commonly held notion that they merely offer support or play apolitical role, should be reexamined.

To cite an interesting example somewhat related to cognitive mapping and conflict, I refer to an article by Efrat Ben- Ze'ev called "Mental Maps and Spatial Perceptions: The Fragmentation of Israel- Palestine", 2012. The author explores map-making methods form an anthropological perspective. Using mental or cognitive mapping methods to explore how Israeli students, both Jewish and Arab Palestinian, perceive their geographical surroundings. She asked 190 students to each draw a map of their country and the Middle East. The picture of the country that emerged is like a puzzle with many missing pieces, made up of geographical bubbles and black holes. It would not be far fetched to allude that the way people perceive their spatial surroundings is quite important. After all, the Israeli- Palestine land conflict is the longest known of our time. Her drawings revealed a general lack of spatial awareness and a disjuncture between the people and their surroundings (Ze'ev, 2012, pp. 250-259).

Finally, the last concern Chambers accentuates is, extracting information that will be used against the people and the risk of exposing people to danger. Most communities have sacred or somewhat knowledge that is sensitive. Once it is mapped and turned into public knowledge, blatantly its not scared anymore and is out of local control. In some cases it could be used to extract more taxes and overall control form outside. Chambers gave a few examples where mapping activities could tell states authorities where you are, which might not be so attractive. He described an example of street children who made maps of their parts of Cairo and in all innocence showed where drug dealers operated, which could have got them in trouble if the authorities learnt and took action. Another example cited was in a refugee camp, children showed the market where they went with their parents to sell relief food illegally (Chambers, 2006, p. 7).

CRITICISMS

Despite the challenges presented, the practice of community mapping is still applauded. Nonetheless, this does not mean it stays un-scrutinized. Often, the literature on participatory mapping tends to focus on the practical issues and methodologies employed rather than the outcomes and power relationships embedded in the process itself. To summarize, the main critiques claim the globalized practice of mapping can be seen as part of neoliberal political-economic processes. So, due to its highly political nature, it is caught within power relations which affect the people, process (mapping) and product (map) involved in the practice.

In the 1998 article, "Mapping Politics" by Jake Kosek; the author focuses on areas that are seldom central topics when addressing the adoption and application of spatial geographic technologies. He gives prominence to the often ignored political nature of maps. Kosek adds to the discourse by closely analyzing the notion of community and more importantly the political nature of mapping. Kosek defines community as a fluid concept with constantly shifting dimensions. He then highlights the radical impact this fluidity has on the mapping process. He also points out other actors such as NGO's being a part of this process thus it is inherent that - interests, agendas and political frameworks are established through the mapping process.
He further alludes to the importance of the social context of maps but he urges that maps should be viewed as a window into a larger political and social process. Noting that counter mapping should be broadly analyzed as a movement and an agent of social change. Central to his argument is the key paradox he highlights: The ongoing phenomenon of globalization - which increasingly erases boundaries and purports to make all places equal; while simultaneously place based, community- based and local movements are emerging across the globe (Kosek, 1998, p. 5). Thus he convincingly argues that the rise in counter mapping is part of the new place based social movements (more people are reinforcing boundaries), which represent a parallel yet divergent trend to globalization. According to Kosek these movements signify the struggles over definition, representation and the meaning of places. Eventually, this will ultimately condition who will and will not have access to or control over resources and people.

To further analyze the political nature of maps, the development of participatory mapping can be situated within the neoliberal political-economic restructuring of the state. Prior to the 1960s, equipping a map-making enterprise was chiefly the duty of a single agency, funded by the national government. However, processes of neoliberalism predominantly since the late 1970's have reconfigured the state's role in the cartographic project. Neoliberalism denotes an emphasis on markets and minimal states, whereby individual choice is perceived to have replaced the mass-production of commodities. In brief, the state can be seen to have delegated some of its mapping power to citizens. Recent critiques of participatory mapping point out the degree to which, as a practice, it has become disciplined by legal prospects for recognition often adopted as part of neoliberal reforms.

To support the political process to which mapping projects are conducted, I draw upon the work of Joe Bryan entitled " Walking the line: Participatory mapping, indigenous rights and neoliberalism." Through his discussion of a participatory mapping project in the Mosquitia region of Honduras, he claims that the practice of producing and using maps involves negotiating a spatially complex terrain shaped by multiple and overlapping forms of territory and authority.

"Questions of what to map and how to go about doing it are thus never merely technical concerns. Instead they are diagnostic of broader relations of power that position participants in mapping projects" (Bryan, 2011, p. 40).

Recent legislative reforms passed by a number of Latin American states, among them Bolivia, Colombia, Honduras, and Nicaragua, affirm the approach of recognizing customary use and occupancy as establishing rights to property. More controversially, these reforms have been bound up with structural adjustment programs supported in particular by the World Bank as part of regularizing property rights, decentralizing political authority, implementing multicultural reforms and territorial zoning.

Bryan argues that mapping should be approached as a spatial science that constitutes a critical site for understanding how relations of power are negotiated and contested spatially. These power relations shape the need to make maps in the first place, thus urging a deeper understanding of how maps are produced and used. More concretely, they provide a means of understanding how neoliberalism as a governmental rationality is interpreted through mapping (Bryan, 2011, p. 41).

In addition, the literature on community-based mapping has been criticized for its dualistic approach to power, culture, and the local, also for reifying material and

discursive forms of domination operating through Western projects such as development and global environmentalism. The critical reading by Bjorn Sletto *"We drew what we imagined" Participatory mapping, performance and the arts of landscape making*, written in 2009 provides a deeper understanding of participatory-mapping workshops as theaters for the performance and negotiation of identities, reflecting the complex articulations between global, political-economic processes and desires for place and belonging. Ultimately, this critical reading indicates an urgent need for greater reflexivity in the application of participatory-mapping approaches (Sletto, 2009, p. 443). According to Sletto, "participatory mapping remains largely a globalized practice caught within global flows of technology, identities, and imaginaries and situated within rigid unequal structures of power and knowledge." (Sletto, 2009).

He points out that, very few mapping projects originate from the margins and even fewer are conducted exclusively by the local people. By the end the mapping process reflects complex power plays within communities in Venezuela and Trinidad as cited in his article (Ibid, p. 462). Thus, participatory mapping reflects the imprint of local – global relations of power, and how such mapping projects produce spatialies that reflect both the material and cultural constructed dimensions of postcolonial landscapes. (Ibid, pp. 464-465)

CHALLENGES OF "PARTICIPATORY" MAPPING

After discussing the applicability of participatory mapping in all its types and dimensions I will now proceed to highlight the challenges of blending participatory research with mapping. In the article, "Participatory GIS: opportunity or oxymoron" the authors' highlight the attempts to integrate GIS (mapping) and Participation. Participatory GIS is important, as it is becoming widely used in spatial decision-making. The force behind its growth has been its use as a policy tool, through the provision of access to manipulate quantitative and qualitative data (Abbot, et al., 1998, p. 27). However, this access has been granted to a limited number of high-level decision- makers, thus this raises the concern that top- down development will be reinforced. Three reasons are provided to support this claim - first, the hardware/software/data are expensive, second, it requires a high level of expertise and

third, it is usually seen as expert systems. Given this, the question then put forth is, whether GIS can give similar access to local people, by owning and using the data to empower them to influence policy decisions? (Abbot, et al., 1998, p. 29).

As discussed later in the article and addressing the above question, the authors' point out three main challenges. First, is the challenge to build participatory GIS, which is user friendly and inexpensive so it can be accessible to local people at district level. Second, it can also be challenging to scale them up to show local concerns as well as broad regional or national perspectives. Third and most importantly, the biggest challenge lies in trying to combine the realities and details expressed locally through participatory methods with the precision and scale of GIS. On a general level, GIS can complement participatory methods if the challenge to integrate them is overcome by finding a common ground. The article concludes with the following issues raised; whether a top down- technology as GIS has a place in participatory research, whether a technology developed largely by commercial companies in North America and western Europe can be used in urban settings in the south, how local knowledge can be integrated with, and represented in, an information system which by definition has traditionally rejected such knowledge in favor of spatially defined expert information. Finally, the suggestion was a shift in name from "Participatory GIS" to "GIS in participatory research (Ibid, pp. 29- 31).

A combination of all these concerns drive someone like Chambers and other practitioners in the field of participatory mapping to ask questions such as:

" Who participates in whose mapping? Whose knowledge, categories, perceptions and reality are expressed? Who owns the map? Where is it kept? Who has access and why? Who understands it? Who updates it? Who uses it and for what purposes? And most importantly, who is empowered and who is disempowered? Who gains and who loses?" (Chambers, 2006, p. 8).

CONCLUSION

In conclusion, the propositional character of maps is that they are arguments about existence. And as such bear the imprint of the social, cultural and political processes of which they are a part. The alternative mapping practice referred to as participatory mapping has now become more re-energized as a term. This is due to a much broader mix of influences and disciplinary perspectives. However, what is

meant by the term “mapping” has at times become rather less clear. A search on Google Scholar for the social sciences, arts and humanities reveals nearly 40,000 academic texts with the word ‘mapping’ in the title. Clearly there’s a whole lot of ‘mapping’ going on. At the same time the semantic ambiguity that has arguably dogged theoretical discourses in recent years presents us with challenges that can enrich, rather than inhibit, critical understandings of the cultures of mapping. In an age when the democratization of cartography has transformed the way maps are produced and consumed, it is not so much the instrumental performativity of maps that is the issue but rather the extent to which cultures of mapping can enhance the democratization and cultures of our everyday lives and social spaces. As a product of a multiplicity of social and spatial practices, it is less what the map is that is the burning question than considerations as to what it does in any given context, and, by extension, how different cultures of mapping negotiate, produce, consume, perform and make sense of what we might tentatively refer to as cartographic knowledge. The literature on participatory mapping has been criticized for reproducing binaries that define the core of development: between local and global, developed and under developed, first and third world, modern and non modern, indigenous and non indigenous and most important rational science and un “disciplined” local knowledge. Nonetheless, the process of making the map is as important as the end product for what it has revealed about the entanglements of identities, social relations, landscape, and power in places on the margins. Finally, the questions posed earlier concerning ethics should be asked over and over again and the people who facilitate the mapping process should carefully analyze all aspects to enhance their ethical commitment.

Personally, I think it is unfortunate that the literature is limited. It does not address the issue, ownership of information, which is highly significant when discussing participatory methods in general. It is also limited for the purpose of this research, which is to see how it has been utilized as a data collection tool for urban planning purposes.

CHAPTER 3. METHODOLOGY

In the previous chapter, a literature review was done to understand the scope of community mapping and how it is being adopted. The following aspects have been identified for investigation:

- Can it be used for data collection & urban planning purposes in developing countries?
- What parameters exist in Gambia that would give grounds for participatory mapping to be adopted for data collection & urban planning purposes?

Now that this basis has been laid, this chapter will proceed with the research methodology that was used for this study.

Usually, research involves formulating the problem to be investigated, selecting a suitable research design, choosing and applying appropriate procedures for data collection, and analyzing and communicating the process and findings through a written report. " The research methodology refers to the research decisions taken within the framework of specific determinants unique to the research study" (De Beer, 1999, p. 23).

This study is descriptive because it will describe the phenomenon of participatory mapping, how it is being utilized in different contexts, and the standpoint of Gambian government institutions with regard to this tool. (Mouton & Marais, 1990, p. 44), state that with studies descriptive in nature, the emphasis is on an in-depth description of an individual, group, situation or organization.

PURPOSE OF STUDY

As stated in the previous chapters, the aim of this research is to explore the potential of adopting participatory mapping practices for data collection in Gambia. And how this in turn could facilitate national urban planning processes.

In this study, the research problem is encapsulated in the research objectives which are as follows:

- To see if participatory mapping can be used as a data collection tool
- Review its application within communities in developing countries as an alternative data collection tool for urban planning purposes
- Explore its plausibility as an alternative data collection tool for urban planning

purposes in the Gambia

Following this, the next discussion will focus on the research design, data –collection methods, sampling, data analysis and finally the limitations of the study.

OVERVIEW OF METHODOLOGY

To gather qualitative data two steps were done. First, secondary data focused on Gambia was collected and scrutinized. Then to collect primary data, I administered structured questionnaires to selected participants. Qualitative questionnaires are at the core of this study's effort to examine if participatory mapping could be utilized to enhance data collection and urban planning processes in the Gambia.

The qualitative nature of the study allowed for feedback from the participants to be analyzed according to the themes that emerged from the responses. Themes are defined as important features that distinguish a case (Gall, Borg, & Gall, 1996). Multiple methods of data collection and analyses serve as a way to ensure the validity of the qualitative data and establish trustworthiness.

DESIGN

The research design is crucial as it determines the success or the failure of research. The research design guides logical arrangements for the collection and analysis of data so that conclusion may be drawn. Thyer in De Vos and Fouche, defines a research design as a blueprint or detailed plan of how a research study is to be conducted – operationalizing variables so they can be measured, selecting sample of interest to study, collecting data to be used as a basis for testing hypotheses and analyzing the results (De Vos & Fouche, 1998a, p. 77).

In this study, I will employ a qualitative descriptive design. Qualitative research has been defined in a variety of ways. In one definition, Strauss and Corbin (1998) identified qualitative research as: any type of research that produces findings not arrived at by statistical procedures or other means of quantification. It [qualitative research] can refer to research about persons' lives, lived experiences, behaviors, emotions, and feelings as well as about organizational functioning, social movements, and cultural phenomena (Strauss & Corbin, 1998, pp. 10-11). These authors elaborated that qualitative research is best used when the methods are: (a)

complementary to the preferences and personal experiences of the researcher, (b) congruent with the nature of the research problem, and (c) employed to explore areas about which little is known. Miles and Huberman (1994) expressed an expanded position and indicated that qualitative research is conducted to: (a) confirm previous research on a topic, (b) provide more in-depth detail about something that is already known, (c) gain a new perspective or a new way of viewing something, and (d) expand the scope of an existing study (Miles & Huberman, 1994).

Based on this collection of reasons, qualitative methods were appropriate for this study. The purpose of this study was to explore the plausibility of participatory mapping to be considered an alternative data collection tool for urban planning purposes in the Gambia, especially for the government. And to describe the outlook of government institutions as to how applicable and useful this tool could be for them. Qualitative inquiry and analysis fit this purpose with stronger sensitivity than a quantitative methodology could offer. Also there exists little research on the topic therefore qualitative methods are suited for this study. Since this study is exploratory in nature, the process of allowing the data to speak for itself further supports a qualitative method of inquiry.

This qualitative study sought to investigate if it is tenable to adopt participatory mapping practices in the Gambia. I was also interested in examining whether this tool has been used in similar contexts, to be precise, in a developing country for data collection and urban planning purposes. With regard to the design of qualitative research, Marshall and Rossman (1999) assert that there are a wide variety of qualitative research genres, each having its own assumptions, methods, procedures, and considerations. They described qualitative research as naturalistic, interactive, humanistic, emergent, and interpretive (Marshall & Rossman, 1999). Last but not least, a major issue in designing case study research is the maximization of conditions related to design quality, i.e. the criteria for judging the quality of research designs. The four conditions or tests are 1. Construct validity 2. Internal validity 3. External validity 4. Reliability (Yin R. K., 2003a).

Although qualitative research is characterized by an emergent and flexible design, a basic research plan was necessary to guide this exploration. The following sections detail the research plan by discussing qualitative methods and the procedures used in data collection and data analysis.

DATA COLLECTION

Qualitative research can be conducted by utilizing a variety of data collection techniques or by choosing one technique in particular. Marshall and Rossman (1999) suggested that data collection methods in qualitative research could be categorized into four types: (a) participation in the setting, (b) direct observation, (c) in-depth interviews, and (d) document analysis (Marshall & Rossman, 1999). For the purpose of my research, I utilized document analysis as the primary method of qualitative data collection. Mainly, documents focused on Gambia such as national development strategy papers, country profile reports, development status and progress reports, the budget speech, development partner reports from World Bank/IMF, UNDP, UN-Habitat and newspaper articles.

The choice of case study as a strategy can be supported by the arguments put forth by Yin. According to (Yin R. K., 1993) "the distinctive need for case studies arises out of the desire to understand complex social phenomena" because "the case study method allows investigators to retain the holistic and meaningful characteristics of real-life events," such as organizational and managerial processes, for example. There are also two types namely, *exploratory* and *descriptive* case studies. In fact, case studies seem to be the preferred strategy when "how or "why" questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context (Yin R. K., 2003a, pp. 2, 5-10). In such a setting, a case study would be an *explanatory* one. Depending on the type of research question posed, the extent of control an investigator has over actual behavioral events, and the degree of focus on contemporary as opposed to historical events. (Yin R. K., 2003a, pp. 1, 3-10).

As a matter of interest, a common concern about case studies put forward by critics is that they provide little basis for scientific generalization (Yin R. K., 2003a). Yin's answer to this:

> "Case studies […] are generalizable to theoretical propositions and not to populations or universes. In this sense, the case study […] does not represent a 'sample', and in doing a case study, your goal will be to generalize theories (analytical generalization) and not to enumerate frequencies (statistical generalization)" (Ibid, p.10)

For these reasons, two case studies were also selected to exemplify and describe the use of participatory mapping methods in developing countries as a data collection tool.

Coffey and Atkinson (1996) suggested that data collection and analysis are best conducted simultaneously in qualitative research to allow for necessary flexibility (Coffey & Atkinson, 1996). Therefore, data collection and analysis occur in a cyclical process until concepts and themes become detailed and redundant and new information ceases to emerge (Miles & Huberman, 1994) (Strauss & Corbin, 1998).

POPULATION

The initial population targeted for this study was both government institutions and Non-Governmental Organizations (NGO's) within the Gambia. But after discovering that establishing communication with the institutions was not swift and almost impossible, a sub population was chosen. The sub-population consists of government institutions. Specifically, they are mainly ministries and mandated national bodies that work under them.

SAMPLING PROCEDURES

A sample is defined as a group of subjects selected from a larger group and including less than all the subjects in that larger group. Sampling is a powerful tool in social research. Sampling procedures make it possible to know how much confidence one can have that the information gathered is similar to the information that would have been gathered if one had studied everyone in the larger group (Fraenkel & Wallen, 209). Tripodi and Epstein (1980) further state that there are basically two kinds of sampling strategies: non-probability sampling and probability sampling. In non-probability sampling, there is no way of determining the probability that any particular sampling unit will actually be included in the sample population (Tripodi & Epstein, 1980, p. 170). For this study I used a non-probability strategy.

Within that path, the technique I chose was purposive sampling. Also called judgment sampling, it is the deliberate choice of an informant due to the qualities the informant possesses. It is a nonrandom technique that does not need underlying

theories or a set number of informants (Bernard, 2002).
To set the sample size, I targeted seven government institutions that are directly and heavily involved in Gambia's urban planning processes. The logic behind this decision was simple. As the institutions that have the authority to implement or support a mapping project, it is necessary to determine their interest in such a tool and to gain an in-depth understanding of how they expect the tool to be of value to them. The number was determined in an effort to have a good mix of institutions representative of general themes in current urban planning discourse for example, land use planning, transportation, economic growth, disaster risk management, habitat &housing etcetera.

The targeted sample then became institutions that met the following criteria:
(a) Is directly and heavily influential for urban planning processes in the Gambia
(b) Would require updated data or generated data to facilitate setting its strategic priorities, goals and baselines.
(c) Is involved with the PAGE (Program for Accelerated Growth and Employment) which is Gambia's current development strategy for the period 2012- 2015.

The selection of the two cases UNICEF – GIS Rio in Rio De Janeiro and Map KIBERA Project in Nairobi, Kenya are justified by 3 reasons. They share common locality, as in they are both in urban areas. The two communities are home to millions of slum dwellers. And both cities Rio de Janeiro and Nairobi share similar socio-economic challenges when it comes to development.

PARTICIPANT SELECTION

The selection process began once institutions were confirmed, and emails requesting participation were sent to each. As a former Gambian civil servant, I do have contact details for most departments especially the for people who worked on the PAGE program. So, the email was self - introductory and a formal way to ask for consent and indicate willingness to participate. The following institutions were contacted.
1. Ministry of Finance & Economic Affairs (MOFEA) – The finance ministry is responsible for the national budget and creating a national economic policy aimed at aiding economic development.
2. Ministry of Local Government and Lands (MOLGL) – Among the ministry's aim

are to gain a fair distribution of government lands, ensure land use maps are available nationwide, and policy creation.

3. Ministry of Works, Construction and Infrastructure (MOWCI) – is charged with overseeing civil works projects, construction of public building, formulation a national transport policy for air, road and maritime.

4. National Environmental Agency (NEA) - The ultimate goal of NEA is to achieve the essential policy objectives of the Gambia Environmental Action Plan as: ensuring an environmentally sustainable economic and social development

5. Gambia Bureau of Statistics (GBOS). The Bureau established under the Statistics Act of 2005 is a semi-autonomous statistics agency. It is the body entrusted to provide official statistics and is responsible for the collection, compilation, analysis and dissemination of official statistical data. The Bureau is as well responsible for monitoring and coordinating the National Statistical System and carrying out central functions required for all other statistical services.

My questionnaire was then forwarded to apt people who could respond to them. As a result some of the respondents are from departments found within the ministries or bodies under an institution. Here they are as listed below together with an organogram:

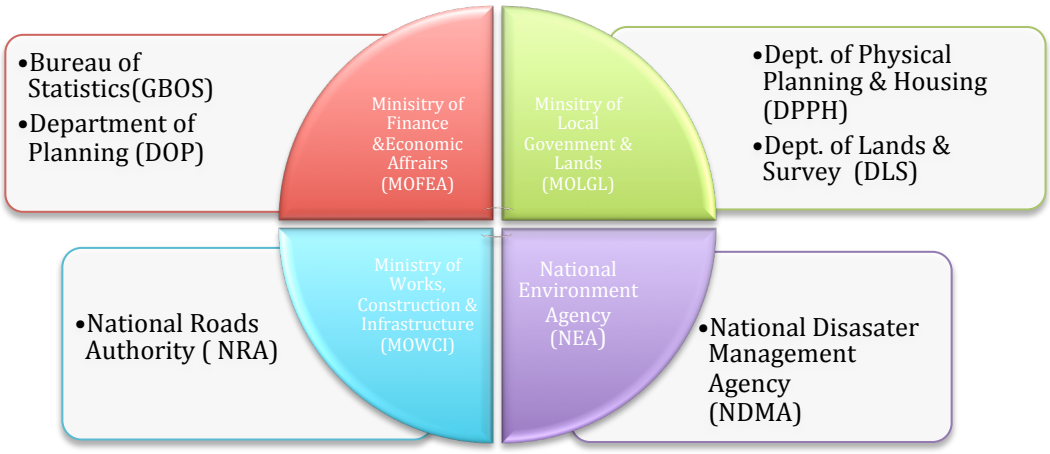
Department of Planning (DOP), MOFEA

Department of Physical Planning and Housing (DPPH), MOLGL

Department of Lands and Survey (DLS), MOLGL

National Roads Authority (NRA), MOWCI

National Disaster Management Agency (NDMA), NEA



QUESTIONNAIRES

A research question is distinguished from other kinds of questions in that information is sought to help solve a carefully formulated problem, the wording is clear and specific, and the respondents are believed to represent a representative sample. A questionnaire can be defined as an instrument with open or closed questions or statements, to which a respondent must react. The usual distinction between types of instruments is between those that are structured and those that are unstructured. In a structured questionnaire all respondents have the same possible choices, all questions are presented to the respondents in the same order, instructions and explanations are fixed and there is no opportunity for the respondents to seek further clarification and this format can be used in both questions and interviews (De Vos & Fouche, 1998a, p. 89).

The next paragraph will focus on the questionnaire that was developed in the process. To gain a detailed understanding of the participants' perspectives related to participatory mapping, I emailed questionnaires to each person I was referenced. The qualitative instrument used was a self-designed structured questionnaire. It had the objective of inquiring (i) the level of awareness the institutions have concerning participatory mapping practices (ii) do they view it as useful and applicable for their institution (iii) if applicable, in what specific ways (iv) and the degree of data availability and sharing within the institutions. The questionnaire consists of two sections a) an introductory part to briefly explain what participatory mapping is and a few contexts it has been utilized. To do this, the case studies of Unicef -GIS, Rio and Map Kibera projects were referenced b) a set of 7 questions, some with sub questions, developed around some of the issues that were captured in the literature review and case studies analysis.

The main underlying issues in the literature review and case studies analysis were used in designing the questionnaire. These are, awareness, cost, and knowledge transfer. The main points under these issues were then formulated into questions. Other questions were added since some of the factors influencing data availability and accessibility are specific to Gambia's context. The questions were arranged from general to specific to follow a progression of the participants' perception and thoughts regarding this subject. For the actual questionnaire, refer to Appendix 1.

DATA ANALYSIS PROCEDURES

These measuring instruments aim to gather data to address the following research objective:

• Explore the plausibility of participatory mapping as an alternative data collection tool for urban planning purposes in the Gambia.

Data analysis in qualitative research has a two-fold purpose: (a) to understand the participants' perspectives, and (b) to answer the research question. Marshall and Rossman (1999), defined qualitative analysis in terms of organizing and attributing meaning to the data. To accomplish these tasks, I followed the three-phase procedure described by Miles and Huberman (1994) which includes: (a) data reduction, (b) data display, and (c) conclusion drawing and verification.

DATA REDUCTION

Data reduction is the first phase of qualitative data analysis (Miles & Huberman, 1994). Data reduction involved the process of selecting, simplifying, and extracting themes and patterns from written field notes, transcripts, and other available resources.

To accomplish this task, I read and re-read the questionnaire transcripts while searching for similarities and differences in the responses and recurring elements. The documents analyzed were also scrutinized to pick up recurring elements and issues. Themes were assigned to the recurring elements that were detected and then organized into categories of related topics and ideas that emerged from participants' perspectives and the document analysis.

DATA DISPLAY

Identified by Miles and Huberman (1994) as the second phase of data analysis, data displays are tools for presenting the results of data reduction. Displays are used to incorporate information into an accessible summary to facilitate later conclusion drawing. Display techniques include quotations, simple tables and diagrams.

The final decision for the techniques utilized in the study was made according to the

results of data reduction. According to Miles and Huberman, form follows function – meaning that particular techniques must be dictated by the research questions and emergent concepts. Once the appropriate technique was identified, data displays were created within each category or for each institution to demonstrate findings across all available sources of information.

CONCLUSION DRAWING AND VERIFICATION

The final phase of data analysis, consists of drawing initial conclusions based on cross-case data displays and then subjecting these initial conclusions to verification procedures. These procedures are intended to verify that findings are appropriate before they are labeled as conclusive results. In qualitative research, results are verified and deemed appropriate by evaluating their trustworthiness (Miles & Huberman, 1994).
The following section is dedicated to discussing the establishment their trustworthiness.

TRUSTWORTHINESS OF RESULTS

While quantitative research relies on measures of reliability and validity to evaluate the utility of a study, qualitative research can be evaluated by its "trustworthiness." As mentioned in (Lincoln & Guba, 1985), this term is used to represent several constructs including: (a) credibility, (b) transferability and (c) confirmability.
A description of each of these concepts is included in the following paragraphs.

CREDIBILITY

The truth-value, or credibility, of conclusions in a qualitative study is comparable to the concept of internal validity in quantitative research. Lincoln and Guba (1985) and Miles and Huberman (1994) suggested that research results be scrutinized according to three basic questions: (a) Do the conclusions make sense? (b) Do the conclusions adequately describe research participants' perspectives? and (c) Do conclusions authentically represent the phenomena under study?.

The qualitative inquiry, as applied in this study, offers a high level of internal validity, as the participants described in their own words and gave their perspectives on participatory mapping as a data collection tool in Gambia. I also relied on member checks to enhance credibility. By sharing a summary of the results with participants via email to confirm its representativeness was to serve as a method to enhance the credibility of this study's results.

TRANSFERABILITY

Similar to the concept of external validity in quantitative studies, transferability seeks to determine if the results relate to other contexts and can be transferred to other contexts (Lincoln & Guba, 1985; Miles & Huberman, 1994). However, external validity, such as the ability to generalize these findings to other government institutions or non-governmental organizations dealing with urban planning is not possible, nor intended. Applicability of the study to serve as background research for interested institutions or researchers both local and international, however, is a goal. Such applicability would allow readers of the study and future researchers to identify pieces of the data that may create an interest or spark the development of further research into the implementation and mainstreaming of participatory mapping practices in Gambia.

CONFIRMABILITY

Conformability assumes that the findings are reflective of the participants' perspectives as evidenced in the data, rather than being a reflection of my own perceptions or bias. I enhanced confirmability by stating explicitly my assumptions about the topic of interest in relationship to my own unique contributions or as they were otherwise brought to my awareness.

DOCUMENT ANALYSIS

Document analysis is a social research method and is an important research tool in its own right. Document analysis is a form of qualitative research in which documents, whether public or private are interpreted by the researcher to give voice and meaning around an assessment topic (Bowen, 2009).

The sources of documents were public records and media. The retrieved documents used in this study were national development strategies – PAGE 2012-2015, Country Progress Reports – Gambia, MDG progress report 2010, Country Profiles – based on UNDP, IMF, and World Bank, Risk profile by CADRI, Urban profile by UN-Habitat, the Government website[13], and newspaper articles from the Daily Observer. The documents were reviewed as a means of gaining additional insight into the institutional context of the Gambia Government regarding data collection, urban management and overall development planning.

LIMITATIONS OF THE RESEARCH

*Field Research – the opportunity to go to Gambia and actually do field research would have expanded the scope of this study and make the experience more tangible.
*Sample – The sample size is relatively small and it would have been interesting to have it be multidimensional. Whereby the citizens, government institutions and NGO's could weigh in on this. For this reason the scope of this study is limited to an institutional level.
*Response rate – it was quiet difficult to establish contact with the institutions and even more difficult to maintain contact with the respondents. Their rate of response was lengthy and in turn, the follow up process became tedious. Most of their websites did not work or the contact details were not updated, as such there were no responses from some institutions and it proved impossible to reach them by email or phone.
*Institutional framework – I had the assumption that the institutional setup is linear, however with this process the intricacy of the setup and how entangled these bodies are was discovered. The system creates a ripple effect for example the NEA was not responsive, consequently the disaster agency under them could not be engaged.
*Time – I am interested in so many facets of this phenomenon and there are so many stakeholders to engage with, however time limitations made it impractical to further assess the implementation and mainstreaming of participatory mapping in Gambia through a pilot project.

Now that the research methodology in the form of a research design, data- collection

[13] www.statehouse.gm

methods, measuring instruments, sampling and data analysis has been discussed, the stage has been set for the implementation of data-collection and analysis process. The next chapters will therefore deal with the presentation of the two selected case studies followed by the analysis of the research findings.

CHAPTER 4. FINDINGS AND ANALYSIS

PART I: CASE STUDIES

This chapter is divided into two parts. Part one will feature descriptive case studies that were selected to address the first part of the research questions - Can participatory mapping can be used as an alternate data collection tool? Has it been utilized within communities in developing countries as an alternate data collection tool, which in turn influenced urban planning process?
Then the second part will feature findings and analysis from the questionnaire and documents reviewed. With the intention of addressing the third research question - Is it plausible to adopt it as an alternative data collection tool for urban planning purposes in the Gambia?

CASE STUDIES 1:
UNICEF – GIS, Rio. Mobile and Web Digital Mapping Solution: Visualizing Risk and Resilience - Rio de Janeiro, Brazil.

BACKGROUND

UNICEF is a trusted organization that protects and promotes the rights of children and it is officially a part of the United Nations (U.N) family. The UNICEF solution toolkit was developed in conjunction with the MIT Mobile Experience Lab (MIT MEL) and Public Laboratory for Open technology and Science (PLOTS). The GIS mapping platform was built upon *open locast,* a platform developed in 2006 by the MIT Mobile Experience Lab and designed to promote participatory journalism and to urge citizens to undertake civic engagement.[14] The toolkit contains a workshop curriculum that deploys the UNICEF-Geographic Information System (UNICEF-GIS). This is an information and communication technology for location based civic media which creates geo-referenced reports for actionable community change. It is also used exclusively by UNICEF Country Offices and their partners to gather critical community data. This is a smartphone application that allows youth to collect and share location sensitive reports in a simple, private and secure manner. The digital application creates a map of all reports filtered by type of hazards and risks.[15] These

[14] http://locast.mit.edu/gallery/
[15] http://www.unicef-gis.org/rio/

maps become a social monitoring and evaluation tool for governments to track their disaster risk reduction activities. A training module was also provided on utilizing the PLOTS balloon and kite Mapping Kit. This way the community is engaged and sensitized about the youth mapping process, and to establish a methodology for the youth to create up to date aerial maps where they may be lacking (UNICEF, 2014).

OBJECTIVE

The project's objective is to empower young people in Rio de Janeiro to create dynamic and change making maps that are produced with cell phones and the Internet. This youth friendly technology is to supply critical information to the local government and community. It can be used by trained young people aged 15 - 25 to securely collect stories and reports about their neighborhood. All information collected is verified by UNICEF and shared through social and civic media channels to generate action for more child-friendly communities.

PARTICIPANTS

According to the project basis UNICEF did not chose professional mappers and experienced journalists, as they feel young people bring a truthful first-hand and real perspective to the program. This choice also serves to validate their data as the government can ignore media and reports created by professionals by viewing them as biased or inflammatory. But wont ignore maps by youth, as they would be denying the needs of their most vulnerable and innocent citizens who are the voices of the future, as well as potential community leaders. Governments can then use UNICEF-GIS maps to prioritize actions within communities (US Fund for UNICEF, 2013).

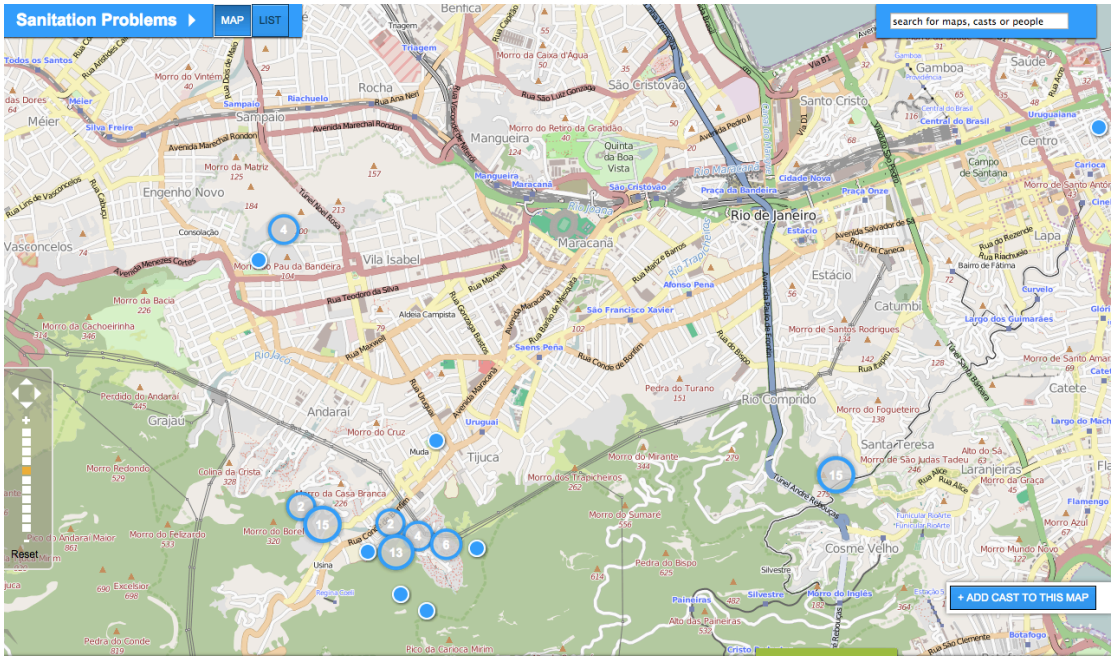
PROCESS

Verified individuals use the tool to generate location specific reports with mobile phones. It is utilized by youth mappers who are selected by local organizations to learn about specific issues and trained to produce geo-tagged reports. The reports are uploaded to a safe and secure website to detail the exact location of community hot spots, which may be services, social spaces, risks and/or hazards. The reports generated are also automatically organized on the map based on issue areas and urgency.

To increase public attention to their reports, the youth workshop curriculum contained a module on digital journalism. Using the UNICEF moderated public platform, Voices of the youth, the participating youth mappers could turn their reports into powerful advocacy materials, which they promoted collectively through other social and local media channels.[16]

DATA COLLECTION

The Maps on the website are grouped into two general links namely *All youth casts: all casts created* and *Just uploaded: new casts*. There is also a colored coded urgency rank with green being least critical to red being most urgent. The layout is then divided into themes as follows: 1. Sanitation Problems 2. Accumulation of Garbage 3. Collapse Risks 4. Walking Hazards 5.Faulty Stairs 6. Social Spaces 7. Obstacles to Reaching Safety Points 8. Houses' Structures. 9. Powerlines Problem.
Here is an example, illustrating the map for number 1, Sanitation Problems.



Source: http://locast.mit.edu/unicef#!itinerary/16/

On a broader scale the UNICEF-GIS system and methodology not only addresses risk/hazard issues but also others such as: cities, social spaces, and services. For cities currently, the system and methodology is designed to map neighborhoods of an urban city and not so much the spread out landscape of rural areas. The

16 http://www.voicesofyouth.org/en/maps/about-us

methodology and data visualization are tailored to compel change in the urban setting. To create social spaces, many citizens who stood to benefit from this toolkit did not have access to computers or the Internet. So as part of the mapping process, youth also located public social spaces where the community came together and disseminated information gathered by the mappers face to face.
Finally for services, with the recognition that in many cities, there are hundreds and sometimes thousands of governmental and non-governmental organizations offering services related to health, sports, etc. Youth mappers using UNICEF-GIS can help a city to map out where services exist, or may be missing, and address the level of youth friendliness and accessibility (UNICEF, 2014) (US Fund for UNICEF, 2013).

OUTCOMES

The impact and some of the outputs of the project are quite interesting. According to the project report, the most prevalent mapped points were locations posing physical harm to children. These points are community locations where an action taken by government, local duty bearer or community itself will make a neighborhood safer and healthier for children. Also the type of risks and hazards were tangible issues such as buildings or roads near collapse, open sewage or garbage, downed power lines and other actionable issues related to sanitation, water, infrastructure, etc.
The aftermath of the 2010 heavy rains, which caused landslides and floods across Rio, claiming many lives, is cited as a specific example of impact that was reported. The poor communities known as favelas were hit the hardest. In the aftermath Brazilian government pledged to increase resiliency. After a detailed geological survey of risk the government delayed action because of an inability to understand the community perspective of risk locations. After the youth were then trained on UNICEF-GIS, they created maps of environmental hazards inside favelas. The government used the maps to prioritize and take action, rebuilding an important community bridge weakened by floods and building a reinforcement wall near a school. The youths also used the maps to coordinate a community cleanup and recycling campaign; which was uploaded on the famous medium YouTube. This resulted in a successful increase of awareness, evidence, action and monitoring on youth and community related issues.[17]

[17] http://www.changemakers.com/discussions/entries/unicef-gis

Since August 2011, with this project, over 300 youths aged 15 - 25 across 12 favelas in Rio de Janeiro, Brazil have been empowered as youth mapping ambassadors, using UNICEF-GIS to report environmental risks and organize action. An additional 5,000 youths engaged directly through mapping activities. Measurable impact was also achieved as municipal government has fixed bridges, mitigated landslide risks and reinforced vulnerable infrastructure. In addition, a community-based organization launched a large scale recycling project and many community cleanups have been organized (Changemakers, 2013).

CHALLENGES

In 2012, expansion of digital mapping in Rio revealed a new challenge. The success of the project led to a new trial, how to deal with the large amounts of data being collected by the mappers. With so many reports coming in, those responsible for assessing the digital maps could no longer quickly see which reported issues were most important. A life-threatening landslide risk near a school demanded more urgent attention than a pothole in the road, a way to rank reports by urgency became needed.

To help create a solution, a grant by the Knight foundation, Voices of Youth, together with InSTEDD iLab Latin America and the Massachusetts Institute of Technology Mobile Experience Lab, developed an automated filter known as the 'Urgency Rank'. Following completion of a prototype, a call was put out to the Voices of Youth community to crowd-source testers for the new filter. Over 300 applications were received from young people around the world. Fifty young people representing more than 40 countries were selected to help test the Urgency Rank feature. Each participant had to upload at least one report of an environmental hazard in their community – with photos, descriptions and tags – in categories such as water, sanitation, garbage and natural resources. The Urgency Rank filter added up the value of the tags to determine the severity level of each hazard.[18]

[18] http://unicefstories.org/2013/11/14/voices-of-youth-takes-digital-mapping-to-the-next-level/

CONCLUSION

To sum up, UNICEF had discovered that given the proper digital media training and tools, youth could be influential and effective drivers to opening government dialogue, activating their community, and driving change to reduce the risk of disaster in poor urban neighborhoods. Over the span of the project in Rio De Janeiro, UNICEF had pioneered a methodology which empowered youths to produce digital maps and civic media that convey the exact location of disaster risks in a way that compels action. This in turn enabled youth-led public advocacy. The maps and digital stories became both empirical evidence and a rallying point for all the parties involved - the community, government and civil society, to come together and take action.

For 2014, the project is aiming to deploy UNICEF-GIS into 5 countries and 15 cities. Hoping to train 1,500 youths and engaging 120,000 more with their maps. Also, following the workshops MIT MEL also conducts surveys of the youths to gain insightful usability feedback so that the platform could be improved for future deployments (UNICEF, 2014) (US Fund for UNICEF, 2013).

CASE STUDTY 2:
MAP KIBERA PROJECT - KIBERA, NAIROBI, KENYA

BACKGROUND

The area of Kibera—located in Nairobi, Kenya—is one of the largest slums in Africa. Despite the active presence of multiple civil society and development organizations in Kibera for many years, this poor community has often remained a blank spot on public maps. On some, it was even marked as a forest. In October 2009, this dearth of geo-spatial information about the slum led a group of social activists to create Map Kibera—an interactive community map of the area. The development of this map paved the way for many other interactive community-mapping endeavors around the world and created new opportunities for participatory development (Hagen, 2011).

Map Kibera was developed in response to the lack of available map data and other public, open, and shared information about one of the world's largest slums: Kibera, in Nairobi, Kenya. While other parts of Nairobi are well documented on online and paper maps, the most densely populated parts of the city, the informal

settlements, remained invisible. Kibera is designated a forest on government maps, and is absent on Google and other publicly available maps. Media in Kibera is also minimal, and residents complained that the mainstream news sources presented only a negative picture – or no picture at all – of the place they call home. This invisibility of up to one million of Nairobi's population and their absence from mass communication as well as policy decisions is what Map Kibera had sought to address.[19] Erica Hagen and Mikel Maron started the project in October of 2009, with initial funding by Jumpstart International. The Map Kibera pilot is the first project by Ground Truth Initiative, established in March 2010. The underlying idea of project is that basic geo-spatial knowledge is needed to support informed discussion on how life conditions can be improved in an area (Hagen, 2011, p. 70). They expected that the provision of geo-spatial information would facilitate better coordination, planning, and advocacy efforts within the community and between the community and the government. As such, Map Kibera did not pursue a concrete, well-defined purpose. Rather, it sought to achieve two loosely defined objectives. First, it aimed to create an accurate geo-spatial representation of Kibera and its life conditions, assuming that interested parties would use this information for a variety of purposes Second, it tried to build the capacity of local community members to use ICT tools to share information about local news, stories, and events among themselves and with the rest of the world. An online platform enabling locals to express themselves was created to balance the unfavorable bias in mainstream news coverage of the area and to allow the community to share positive information about itself (Ibid).

PROCESS

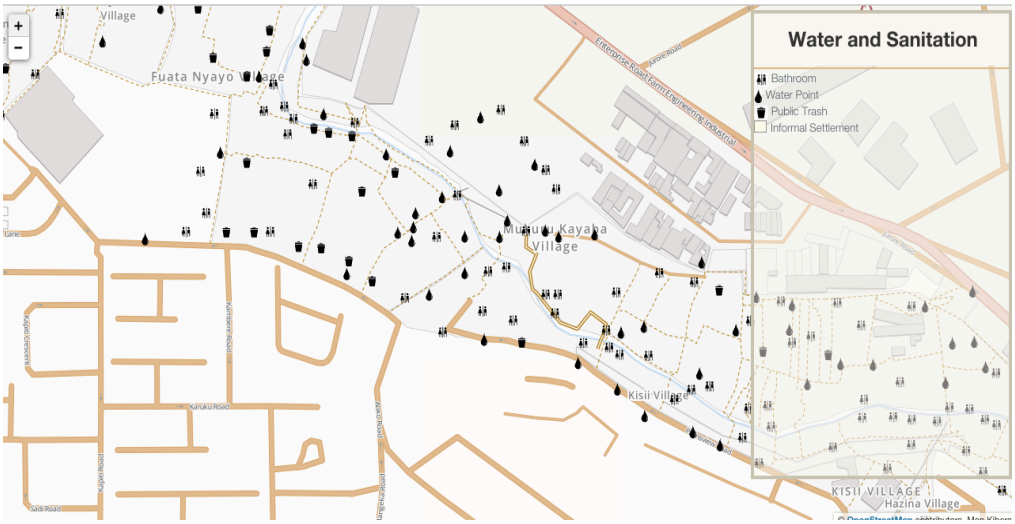
To achieve goals based on the two objectives, interactive community mapping (ICM) was initiated. ICM is a process that engages individuals in creating a map of their community by developing improved maps of roads, settlements, buildings, local businesses, and other services. The ICM process aims to help community members, governments, civil society organizations (CSOs), and development partners to harness the collective wisdom and knowledge of these communities and to become drivers of development. ICM was used to assess the needs and concerns of the mapped communities and to tailor development activities accordingly. Map Kibera, can then

[19] http://www.bbc.co.uk/news/technology-12164081

be described as a prototype for many other ICMs, since it is an interactive community map of Kibera (Shkabatur, 2014).

The mapping process relied exclusively on local residents, who were recruited and trained by the Map Kibera team. The team also invested considerable efforts in the "digital storytelling" layer of the map, providing local residents with social media tools to capture daily life. In the first stage of its operation, the team partnered with local CSOs and, with their help, recruited 13 volunteer community mappers residing in Kibera. It also trained participants to use GPS devices, collect and edit geo-spatial data, use video equipment, work with the OSM platform and other relevant software, and to use social media and blogging platforms such as Word Press (Hagen, 2011).

After completing a brief training, community mappers started collecting data using simple GPS devices. The team guided the mappers to include "points of interest," thus granting them discretion to decide what pieces of information should be part of the map. The whole process of data collection lasted three weeks, after which mappers imported the information into the OSM software and generated the first detailed map of Kibera .The second phase of the Map Kibera project was a more contextualized approach and deepened the map's coverage of life conditions in the community. In response to demands voiced by local CSOs, the team collected detailed information on issues of health, security, education, and water and sanitation. These are the same themes found on the website. In the area of health, for instance, they collected information about the working hours of clinics operating in Kibera as well as the services provided by them. This information was then added on top of the original ICM layer, which only showed the location of a clinic (Shkabatur, 2014). To visualize an actual map currently on the website here is an example of the map on water and sanitation. The legend on the right is: Bathroom, Water Point, Public Trash, and Informal Settlement.



Source: http://mapkibera.org/theme/watsan/

At this stage, the team also introduced the Voice of Kibera initiative—an online news and information- sharing platform for the Kibera community. The website relies on geo-located citizen reporting and contains news stories, photos, videos, and messages shared by residents. It allows local residents to speak for themselves on current events and issues and creates a digital community around local information.[20] The website is constantly updated by the Map Kibera team with videos, photos, and stories on daily life in Kibera. The initiative benefited from a moderate information infrastructure since local mappers were able to use the offices of KCODA, a local CSO, to access the Internet and use OSM software. Technical training was also given by having local geographic information system (GIS) specialists available to assist community mappers in performing their tasks (Ibid).

IMPACT

Community:

It is reported that the mapping project itself was well received by local organizations- CBOs, NGOs, and local government. Within the community, it was embraced as something missing that is seen as a basic entitlement: to exist on a map. The map seemed to bring the community closer to legitimacy and give a sense of being a real neighborhood. Sensitive to external perceptions and its negative reputation, Kiberans appreciated any image such as this map that portrayed their community in a positive

[20] http://voiceofkibera.org/

light. Local organizations were also keen to be represented and eager to learn how they can make use of the map as well as the Voice of Kibera site to highlight their activities (Berdou, 2011).

International:
The data collected is being reused internationally in other projects, for instance in Flickr and other applications that include a map. Groups that are interested in a variety of issues such as health, gender-based violence, sanitation, new mobile phone services, farm-to-market supply chain, large-scale conflict mapping, peace promotion, and others have liaised with the directors to look into collaboration or use of the collected data. Unicef emerged as a partner and supported Phase 2, which has increased full time staff to three, while new volunteers came on board with backgrounds including anthropology, public health, media, and GIS. Due to using a computer lab and the creation of a Facebook group, the mappers have become avid Facebook users over the course of the project. Access to Facebook on their mobile phones also signaled an increase of Internet use among Kiberans via mobile (ibid).

CHALLENGES

The initial idea of Map Kibera was focused on the supply side of ICM—create an accurate map of Kibera and assume that interested parties would use it for a variety of purposes. However, the data remained largely untouched because too little attention was paid to the need for information. This situation changed when the team began collaborating with local CSOs and mapping information that responded to their concrete needs (Hagen, 2011). The generalist nature of the map and lack of attention to the need for specific information on the part of local CSOs and other potential users limited the immediate usability and relevance of the map for organizations working on the ground in Kibera. As a result, the capacity exhibited by CSOs active in Kibera did not fully translate into concrete use or impact—while CSOs helped to generate the map, they did not use it to inform their own strategies and activities.
Government participation was another challenge. Government representatives were not part of the mapping process, did not endorse the map, and apparently did not use it, which limited its usability and impact. Finally, as in many other community-mapping endeavors, incentivizing participants proved difficult. [21]

[21] http://groundtruth.in/2014/03/04/challenges-of-openstreetmap-in-institutions/

CONCLUSION

With both of the projects similar issues arouse. The process presented in both cases entails a range of trade-offs and challenges. One of the most difficult trade-offs is the need to choose between community empowerment and capacity building, on the one hand, and effective delivery and use of the map, on the other hand. As the objectives of such projects become defined, special attention should be placed on enabling factors. The six broad enabling factors are: a supporting information infrastructure, need for information, civil society capacity, government cooperation, community mapper incentives, and the quality of collected data. These six identified have a great impact on the success and sustainability of such projects.

CHAPTER 4: PART II

This section presents analyses and discusses the research findings from the questionnaire (see Appendix 1) of this study as described in section of the research design. The results are divided into two groups a) deals with the institutions that were selected as participants, their response rates, and a breakdown of each question as addressed by them and b) deals with a thematic analysis of the data.

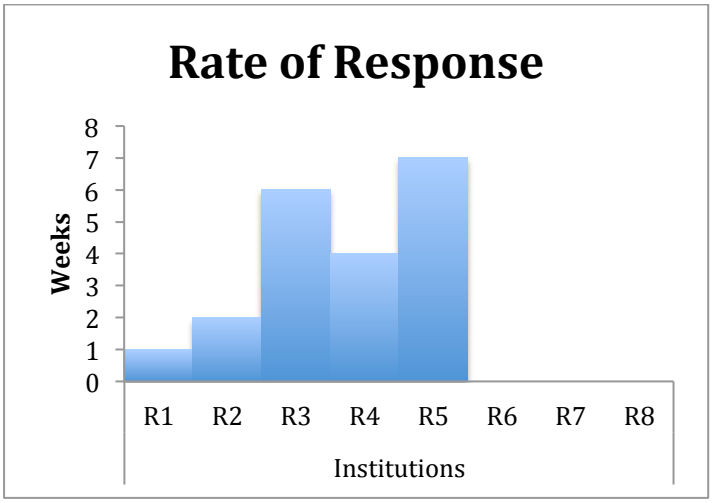
The respondents are coded as:

GBOS – R1 DOP – R2 MOWCI – R3 NRA- R4

DPPH – R5 DLS – R6 NEA- R7 NDMA – R8

FINDINGS

This section will begin with summarizing each of the respondents answers to the questionnaire, in this case the 8 institutions; followed by an analysis based on themes that were deduced from their responses.



Refer to table 1.1, Appendix 2

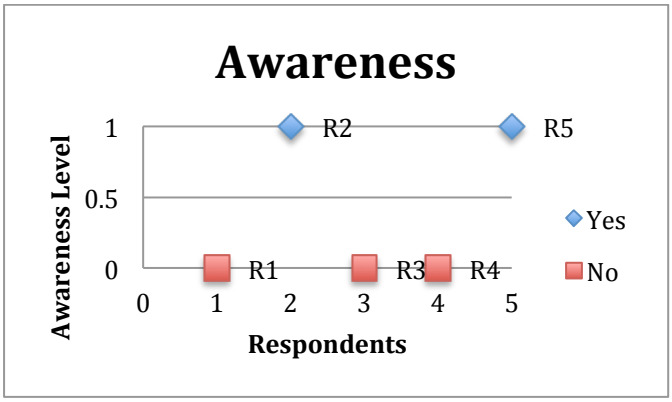
The rate of response was quiet slow. Only R1 gave feedback within a week. Most of the responses were received within the 4-8 weeks period.

We will now look at the actual responses. Please note that these are not in chronological order as presented in the actual survey. Please refer to Appendix 1 to see questionnaire. For ease of understanding the close-ended questions will be looked

at in graphs where by the open-ended questions will be dealt with in text categorically.

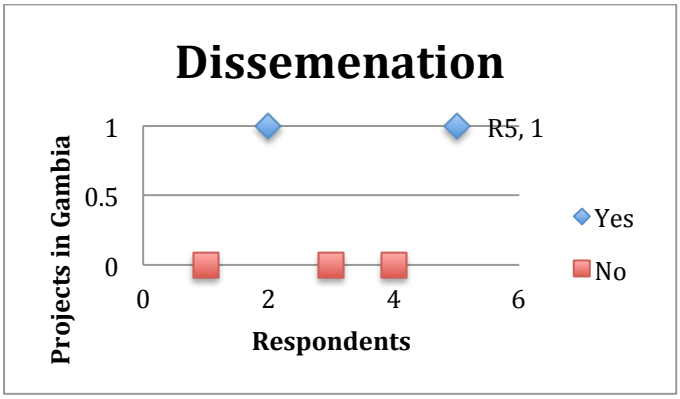
The scale in the graph depicts, 0 = No or negative response and 1 = Yes, positive response.

The respondents were asked if they had ever heard of the term "participatory mapping" before. Only two answered yes, R1 and R5.



Refer to table 1.2, Appendix 2

This graph is about if the respondents know of any participatory mapping projects in the Gambia.



Refer to table 1.3, Appendix 2

Most of the institutions answered no, however R2 and R5 said yes and went on to answer the following sub-questions.

Do you know of any projects?

R2: Not as a project, but as a tool/technique, yes. Trainings were conducted and development practitioners in The Gambia have used participatory mapping.

R5: Yes. In Ebo town, Tobacco road and Jambari Sanneh, Brikama.

A) Were there international partners in the project?

R2: N/A R5: Yes

B) What motivated the decision to use Participatory Mapping?

R2: N/A R5: Slump upgrading, UN Habitat Project.

C) When was it used, and for how long?

R2: N/A R5: Since 2008 and it is ongoing.

D) Are there publications or reports describing its implementation?

R2: N/A R5: Yes

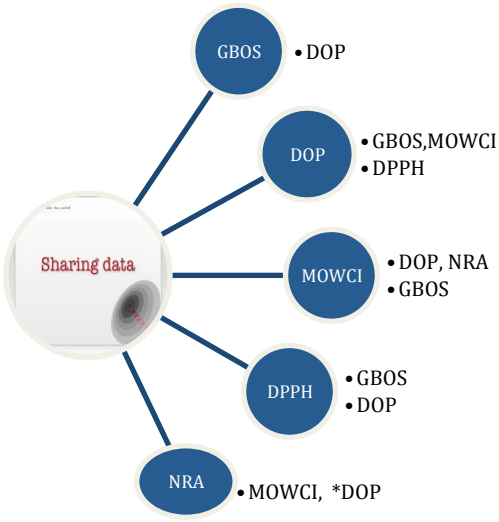
E) What kinds of success or failures were experienced?

R2: N/A R5: Yes. Since it is ongoing it is successful because we finished the first phase.

F) Was the project mainstreamed?

R2: N/A R5: Yes.

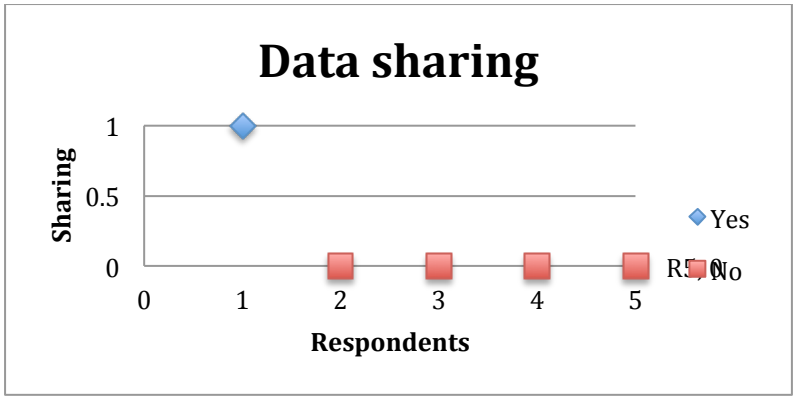
This shows the collaboration that exists between the eight institutions, according to their answers.



Refer to table 1.4, Appendix 2

Looking at this chart, one can say there is a fair amount of collaboration occurring within institutions. However it is important to note that the answers provided do not tally. For example MOWCI and DPPH claim to share data with GBOS, but looking at the table GBOS has indicated only one institution DOP. To point another mismatch, NRA has included DOP in their response, but looking at DOP's list NRA is not mentioned.

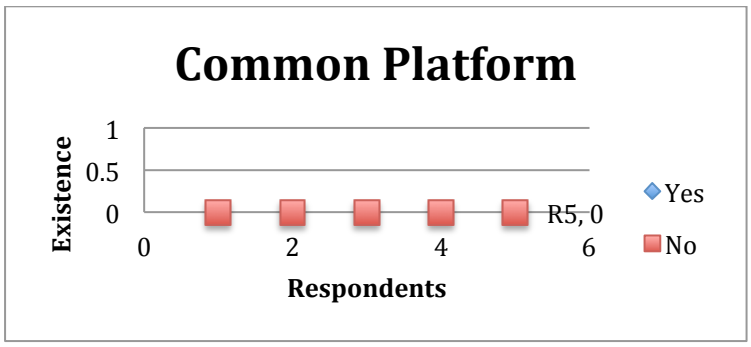
Apart from collaborating, this next graph shows if open data sharing occurs.



Refer to table 1.5, Appendix 2

Only R1 gave positive response. Being the statistics department of course one of their tasks is to disseminate information from census and other studies.

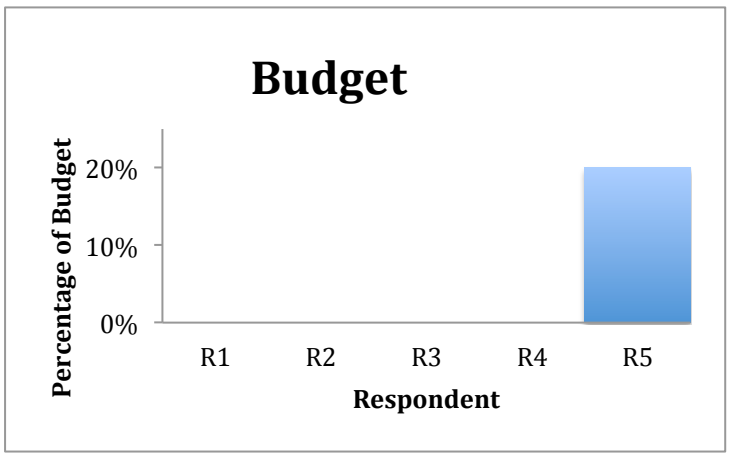
The subsequent part is to see if data sharing occurs on a common platform.



Refer to table 1.6, Appendix 2

Having a common integrated platform such as an online database, a shared library/resources center or a website, is something none of the respondents answered positively.

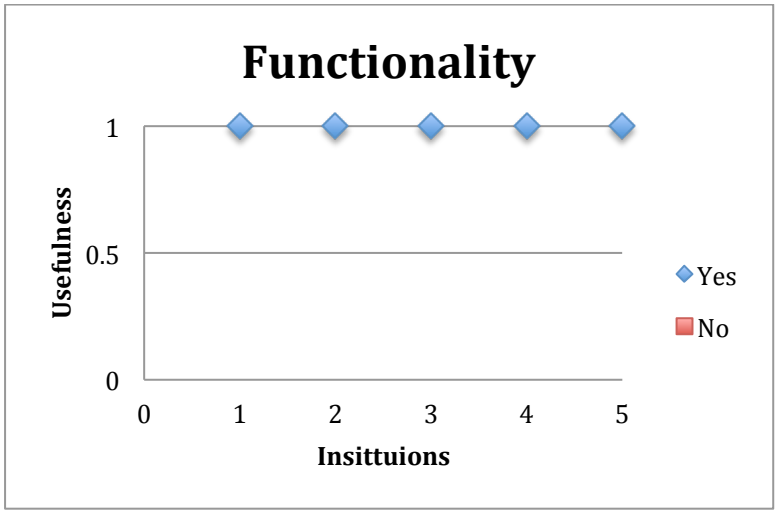
Percentage of budget dedicated to research: data collection / mapping activities?



Refer to table 1.7, Appendix 2

Only R5 could give an estimate of how much from their institution's budget is dedicated to research, claiming its roughly 20%.

Could participatory mapping be useful for your institution? This was the question posed. Here are the responses.



Refer to table 1.8, Appendix 2

100% of the respondents answered yes and when asked to specify in what way it could be useful for their respective institutions. Here are some of the responses.

According to R1,

" GBoS as the Custodian of national statistics is tasked the responsibility of collecting, processing of data and dissemination of statistics; thus people from all works of life walk into our office to seek for data from diverse areas. It would be a worthwhile project/ program for the bureau that will help in the availability of data."

While R2 expressed that,

"*It will further enhance the participatory nature of development planning, including monitoring and evaluation, contributing to enhancing policy formulation*."

In a similar vibe, R5 stated,

"*It will enable us to know and identify problems in the affected or study areas which would be helpful in upgrading facilities in each area*."

And this last response concerning the usefulness of participatory mapping is from R4 *"... it can be used to generate traffic data based on trip attractions and distributions. This can be used to better manage the road network at the planning and design stage and allocate resources accordingly. It can also be a key tool to record accidents and identify critical locations in the network..."*

The final question that the survey seek to address was - how would they describe in general, the availability and accessibility of data related to housing, transport/road network, crime, community maps, zoning, etcetera in the Gambia. The responses are presented in the manner below because it is important to see the way they chose to answer. I believe it portrays their awareness level on the issue. Only one respondent gave an answer that did not provide enough detail for me to critically assess it against the others. That was R5 saying,

"*Usually data in The Gambia is easy to access because there is cooperation between institutions*."

However, R1 representing the central institution for data collection stated,

"*Data is not readily available and/or accessible. One of the main problems is ignorance of the general populace when collecting data. This means more sensitization should be done to improve awareness to the public and institutions. Crime statistics has been a challenge for the bureau for a long time now several attempts have been made to get access to crime statistics but to no avail. Another problem is the availability of funds, which makes it difficult to conduct certain studies in which case making the availability of data not readily available. "*

R3 was precise by stating,

"Very little data is available of the road networks. What is available tends to lack detail. This may be as a result of inadequate data collection and management"

In addition here is the comment from R2,

"Data is generally available on the above from the relevant institutions. However, the regular updating of these data can really help in enhancing the periodic monitoring and evaluation of our national/ sectoral development objectives. This could also improve the planning efforts by way of providing important baseline information and enhance target setting."

From this feedback, a general picture begins to form and certain themes emerge as basis for analysis.

ANALYSIS

The purpose of the study is to investigate if there is a potential for participatory mapping to be adopted at an institutional (government) level in the Gambia; especially for urban planning purposes. Having gone through the findings of the survey, the responses spurred certain themes to come to light. In this section the focus is to further delve into the results by analyzing them thematically. From the various categories that came up, the prominent ones were grouped into themes as follows: Awareness, Knowledge Transfer, and Cost.

AWARENESS

As the first question of the survey deals with prior knowledge of the term, participatory mapping, the answers indicated a level of awareness about the term itself or its use. This may be a phenomenon widely used and known to development practitioners especially for Participatory Rural Appraisal (PRA) as documented by institutions such as the Food and Agricultural Organization (FAO) and World Bank to name a few. However, looking at the findings (table 1.2) only 2 of the respondents answered yes. Given that the term is associated with tools (PRA, etc.) that have been used in the fight to alleviate rural poverty by development workers, it is surprising that most of the respondents claim to not have heard of the term before. This indicates a low level of their awareness about participatory mapping as a tool, a concept or as a practice.

Furthermore, I also wanted to know if the participants were aware of any participatory mapping projects in the Gambia. The data presented in the answers showed that (table1.3) there are not many mapping projects going on in the Gambia, if at all any. And if there are then the awareness level of this amongst government institutions is low. The only respondent that said yes was R5, and claims that the project is still ongoing. So it is contrasting and shows a gap as R1and R2 both give answers that indicate their lack of awareness. This befittingly leads to the next theme of knowledge transfer.

KNOWLEDGE TRANSFER

Sub questions are posed as follow-up to further explore if there are any mapping projects in the Gambia. The questions revolved around, the partners involved, what motivated the project, its usage, duration and finally dissemination. Given that there is a question about past or ongoing participatory mapping projects, the subsequent questions were to gauge awareness but in the end reveal knowledge transfer issues. As mentioned above, all of the respondents except R5, say they know of no mapping project and therefore automatically did not answer these subsequent questions. However, R5 confirms to be aware of a mapping project in the Gambia and specifies the three places- Ebo town, Tobacco road and Jambari Sanneh in Brikama. The motivation behind it is slum upgrading and the international partner involved is UN Habitat. The project is ongoing since 2008. In response to the failures or success aspect, R5 stated that it is successful and that the project was also mainstreamed. The response is vague as it does not explicitly say what successes were achieved in detail and it does not mention or give detail as to how the project was mainstreamed for example a report, a document etcetera. If a project is mainstreamed then other institutions, certainly those dealing with data and statistics such as GBOS should be aware of it. Also it is an upgrading project, which should usually involve other institutions at some point, so it is more surprising that the other respondents did not provide any answers.

Upon further research, the UN- Habitat (PSUP) project that R5 highlighted called participatory slum upgrading program, is in Phase II. However, I could not find online or on UN- Habitat's website any report on phase I. The only indicator of success found is the PSUP narrative report (2009) published by UN- Habitat, which confirms the launching of Phase I in Gambia, along with other countries. Based on this, one can argue that it is too soon to declare the project successful. Its process is participatory in nature but that doesn't mean it entails a mapping aspect nor does it assure that its outputs and outcomes are going to be derived from a participatory mapping activity. These specifics are yet to be captured in a project report. Therefore, the degree to which mainstreaming occurs is quite low, and has a great impact on knowledge transfer.

As Robert Chambers argued about information and the ownership of information, this is to some extent related knowledge transfer. Project reports and such documents are

not easily accessible to community members, as it is generally not intended for their use to begin with. In this case it is UN-Habitat, thus how accessible the information will be to the community members and how much knowledge transfer could occur between institutions and the respective communities is questionable.
I think it especially interesting that the only participatory mapping project that is referred to is one that was initiated by UN-Habitat, which shows how these sort of concepts are transported and translated into local cases through such larger organizations that are more up to date with these current concepts.
Another aspect to also consider is related to data sharing and collaboration. According to the summary of the responses (table 1.7) none of the institutions respond to having a common integrated data sharing space for example an online database, a data resource center or website. Indeed having such shared platforms would go a long way in helping with knowledge transfer and even transparency issues.

COST

Of course when it comes to government institutions, funding and financial costs can either advance or hinder a project or development program. Naturally a budget should be allocated to a government institution with shares of it apportioned for different tasks. The survey posed a question asking if an estimate could be given on how much of their budget is spent on research activities such as mapping or data collection. Out of all the respondents only R5 provides an answer, stating a rough estimation of 20%. An institution with mapping and data collection as its main activity should be able to give an exact estimate of how much of its budget is spent on such priority activities. Furthermore, it could aid in knowing how much deficit they encounter, this way it informs their budget proposal to the Ministry of Finance or to apply for external donor funding. This is even more crucial for bodies such as the Department of Planning- responsible for all planning activities in other words a central figure, and equally for GBOS the institution for national statistics. With the exception of R5, the fact that all of respondents left this section blank clearly reflects a lack of financial planning.

Generally, GBOS operates a population census every 10 years and in between conducts surveys and studies on health, poverty, baselines, etc.[22] As reported in The Observer newspaper on 8th November 2012, the statistician general at the Gambia Bureau of Statistics stated the budget for the fifth population and housing census, which will take place in 2013, is estimated to be above US $4 million. He also recommended a donor conference be held to solicit more donor funding for the 2013 census.[23]. In the same newspaper article, the statistician general pointed this being the first time The Gambia is using modern Geographic Information System (GIS) technology in census mapping, adding that with this technology, high quality census maps would be produced using satellite imagery while a GIS database will be developed. Some of the short-term objectives mentioned include; to develop skills of the GBOS staff, Geographic Information System (GIS), data collection, data processing and analysis, data dissemination and utilization; improve availability, accessibility and utilization of census outputs in a timely manner.

Presumably, the MOLGL also uses GIS for mapping and data collection activities. GIS mapping is a project in itself and can be quite costly. According to the conference paper, *Connecting a Digital Europe through Location and Place,* the financial cost of data collection and processing per observation is another important characteristic of Geographic Information. The higher the quality of the technical and human resources used for data collection, the higher the cost for their usage is (Spyratos, Lutz, & Pantisano, 2014).

In the World Bank document *Interactive Community Mapping: From Empowerment to Effectiveness,* Costs issues related to mapping activities were featured. The ICM process typically relies on relatively cheap and basic technological devices and employs free and open-source software. Mappers belong to the mapped community and bring to the project unique tacit knowledge of their living environment. By and large, they volunteer to participate in the process after completing basic technological training, offered by ICM experts (Shkabatur, 2014, p. 3). The cost to produce an interactive community map is therefore substantially lower than the costs to fund traditional map making.

[22] www.gbos.gov.gm

[23] http://observer.gm/africa/gambia/article/over-us4m-needed-for-2013-census

CHAPTER 5. DISCUSSION AND CONCLUSION

This chapter further discusses topics that were deduced from the survey and document analysis. These topics are organized into the following themes: Institutional Capacity, Knowledge Gap, Urban Profile, Risk Profile, and Functionality. This is immediately followed by my final thoughts and then a conclusion.

DISCUSSION

INSTITUTIONAL CAPACITY: HUMAN, FINANCIAL & TECHNOLOGICAL

- **Human**

One of the biggest challenges for the government is how to curb the high turn over rate within the civil services. In the Gambia governance profile by the African Development Bank the comments in the conclusion and recommendation section points this out. According to this report, most of the institutions visited during the preparation mission, were characterized by serious resource and capacity constraints aggravated by excessive turnover of staff. This poses a challenge to any capacity development program (African Development Bank, 2007).

Looking at the context, the public sector is generally characterized by (i) extremely low salaries (ii) absence of modern human resource management (iii) and job insecurity due to arbitrary posting and dismissal of staff. Given this, there is a high turnover of staff with discontinuity in policy design and implementation. This renders capacity development largely unsustainable. Consequently, the impact of this is a key factor in the country's low score on government effectiveness (African Development Bank, 2007, pp. 2-6).

- **Technological**

The Gambian government is involved in the General Data Dissemination System II (GDDS) Project for 22 Anglophone African Countries. The project is based on the International Monetary Fund (IMF's) GDDS framework and was funded by the UK Department for International Development (DFID). It is an $8 million three-year project, implemented jointly by the IMF and the World Bank.

These institutions assist countries that require greater attention and technical assistance in enhancing capacity building in macroeconomic and financial

statistics, and in socio-demographic statistics. The project, referred to as the Phase II project, has a general framework established in 1997 to guide participating countries in developing sound statistical systems as the basis for the provision of data to the public. Therewith covering Population, Health, Agriculture, Justice & Security, Management, Labor, and GIS (Morrison, 2009).

The Gambia has decided to work with the World Bank on the following topics- GIS, and Management of Statistical Services. For each of these topics priorities and plans for improvement were formulated. For topic 1- GIS, the priorities are 1) Training 2) GIS hardware and software Priority and 3) Census mapping. For topic 2- Management of Statistical Services, the priorities are 1) National Statistical System (NSS) coordination 2) Training and capacity building 3) Budgets and Fund for NSS.[24]

- **Financial**

Lets take a quick look at the country's economic profile according to the World Bank and IMF. The country is categorized under the Sub-Saharan region in Africa. It is then classified as a low- income country. The current Gross Domestic Product (GDP) is US $914.3 million, compared to its neighboring country Senegal at US $15.15 billion. The Gross National Income (GNI) per capita in Gambia is calculated at US $510, compared to its two neighboring countries Senegal, which stand at US $1,070 and Cape Verde at US $3, 630. [25] Indicators of poverty are pointing at poverty headcount ratio at national poverty line (% of population) to be 48.4%. The country's economic stand is further illustrated on the World Bank's graph attached in (Appendix 3). Furthermore, the United Nations Human Development Index (HDI) - a comparative measure of life expectancy, literacy, education, and standards of living for countries worldwide- has for the year 2013, placed Gambia number 35, out of the 50 African countries ranked. This places Gambia in the "low human development" category (UNDP, 2013).

[24] http://go.worldbank.org/45HVY6YGL0

[25] www.worldbank.com, http://data.worldbank.org/country/.

It will be partial to speak about finances without taking into consideration the national budget. Looking at the figure for the year 2014, the Minister of Finance unveiled an estimated total of D8.6 billion (Dalasi). This is to be derived from domestic revenue and grants, representing an increase of 1 billion on the 2013 budget of D7.6 billion. Moreover, D313 million of that total came from the World Bank and African Development bank.

To understand the breakdown of the national budget I have attached the copy of the sectoral allocation section (Refer to Appendix 4). It is key to note that the Ministry of local government and lands is not in the list. Instead it is captured under the * others category at the bottom of the list. This is for all other ministries not listed in the table. Such information makes it valid to question institutions like MOLGL and GBOS amongst others in this survey and how financially constrained they are as government bodies.[26]

It would be worthy then to for such institutions to look into cheaper yet effective ways to carry out their tasks and obligations. In the case of MOLGL, which is in charge of Department of Physical Planning and Department of Lands and Survey, it might be worthwhile to look into alternate data collection/mapping tools and projects possibly cheaper than the traditional GIS method. Participatory mapping practices being the alternate advocated for; generally relies on cheaper technological tools. In the case studies featured earlier in this research the UNICEF-GIS, Rio project could serve as a good example to demonstrate this point. The interactive community mapping (ICM) process typically relies on relatively cheap and basic technological devices and employs free and open-source software. Mappers are also the inhabitants of the community and bring to the project unique tacit knowledge of their living environment.

KNOWLEDGE GAP

There are numerous documents guiding overall development in the Gambia. The common one being the Millennium Development Goals (MDG's) that all developing countries are striving to achieve. These objectives from the United Nations comprise of 8 universal goals and countries produce reports to show their progress. For the purpose

[26] http://www.statehouse.gm/2014-Budget-Speech_19122013/budget_2014.pdf

of this paper we will focus on goal number 7: Ensuring environmental sustainability. This goal is further divided into the targets 7A. Integrate the principles of sustainable development into country policies and program and reverse the loss of environmental resources 7B. Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss. 7C. Halve by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation. 7D. By 2020, to have achieved a significant improvement in the lives of at least 100 million slum dwellers.

I shall accentuate target 7D, as this is the one explicitly dealing with urban settlers. The indicator for progress toward this goal is - proportion of urban population living in slums (Ministry of Economic Planning and Industrial Development, 2010). In the summary table from the MDG report, 2010 the progress tracks are presented**.**

GOAL 7 ENVIRONMENTAL SUSTAINABILITY	
• ***Target 7A***: Integrate the principle of sustainable development into country policies and programmes and reverse the loss of environmental resources.	On track
• ***Target 7B***: Reduce Biodiversity Loss, achieving by 2010 a significant reduction in the rate of loss.	Insufficient Progress
• ***Target 7C:*** Half by 2015, the proportion of People without sustainable access to safe drinking water and basic sanitation.	On track
• ***Target 7D:*** By 2020 to have achieved a significant improvement in the lives of at least 100 million slum-dwellers.	NA
GOAL 8 DEVELOP GLOBAL PARTNERSHIP FOR DEVELOPMENT	
• ***Target 8***D: Deal comprehensively with the debt problems of developing Countries through national and international measures in order to make debt sustainable in the long term.	On track
• ***Target 8 F:*** In cooperation with the private sector, make available the benefits of new technologies, especially information and communication	On track

Table as presented in MDG Status report, 2010

The target for goal 7D on this table says not available (N/A). Looking at the next table provided, it is astonishing to see the lack of data accentuated in this table marked as - (N/A). Not only was this the case for the sub-target 7D but also for the entire goal number 7, having almost 85 % of its columns marked N/A.

Target	Indicators	MDG Target	MDG Status 2009								
			National	BCC	KMC	WR	NBR	LRR	CRR-North	CRR-South	URR
Goal 7: Ensure Environmental sustainability											
Target 7.A: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental	7.1. Proportion of land area covered by forest	40%	50%	NA	NA	NA	NA	NA	NA	NA	NA
	7.2. Carbon dioxide emissions: total per capita and per $1 GDP (PPP) and consumption of ozone-depleting substances	.18	4.42	NA	NA	NA	NA	NA	NA	NA	NA
	7.3. Proportion of fish stocks within safe biological limits		74.1%	NA	NA	NA	NA	NA	NA	NA	NA
	7.4. Proportion of total water resources used	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Target 7.B: Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss	7.5. Proportion of terrestrial and marine areas protected	10%	4.09%	NA	NA	NA	NA	NA	NA	NA	NA
	7.6. Proportion of species threatened with extinction	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Target 7.C: Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation	7.7. Proportion of population using an improved drinking water source	85%	85.2%	100[1]	91.0	79.2	89.1	82.6	83.4	81.7	87.6
	7.8. Proportion of population using an improved sanitation facility	92%	84.2%	96..6	95.8	94.0	86.2	65.5	77.1	30.7	86.4
Target 7.D: By 2020, to have achieved a significant improvement in the lives of at least 100 million slum-dwellers	7.9. Proportion of urban population living in slums	NA	45.8	NA	NA	NA	NA	NA	NA	NA	NA

NA = Not Available

[1] Source: 2003 Census

Table as presented in MDG Status report, 2010

The lack of data obviously affects the progress tracking report, its evident that unlike saying on track or insufficient, the progress for target 7D cannot even be measured. The document went on to state the following major challenges regarding urban housing: rapid urbanization as a result of rural-urban drift, rising urban poverty, limited capacity to implement housing regulations, and limited capacity of utility services expansion to match rapid urbanization.

Considering the evidence provided showing that lack of data. This strongly supports my argument that data collection and analysis should also be prioritized for urban housing and other urban planning related issues. If not, development goals and plans will become more vague, impossible to track as exhibited in this case and subsequently difficult to achieve.

Having dealt with development from an international scale. Now lets look at it from the national level. The Gambia has a short-term development strategy paper entitled, Program for Accelerated Growth and Employment (PAGE 2012-2015). This is currently in use to guide and measure all development goals at a ministerial level. Within this document the only place data collection and analysis was giving priority was within the section dealing with health. The document is heavily focused on economic growth as how it relates to overall national development. It also puts forth certain challenges for good governance , one of them being "the limited availability of up-to-date data" (Ministry of Finance and Economic Affairs, 2011, p. 104). And although the lack of data and resources is hinted here and there it is not highlighted as an overarching challenge in itself. Which could then be prioritized and addressed

through proposed strategies and outputs. Also mentioned in the PAGE is the prior national development strategy that was dated for the period 2008 – 2011.
As mentioned in the document, the strategic plan detailed out major statistical operations that were supposed to be carried out but due to limited resources some of these activities could not materialize. Consequently, the GBOS is currently in collaboration with stakeholders to develop a second and more comprehensive action program for the period 2012 – 2016. With the hope to highlight the need to address capacity building through training, coordination both in technical and legal terms as well as fostering stronger linkage between the statistics and the planning functions of Government.
The PAGE document doesn't specify any goals or objectives that allude to an urban development and management project or mandate a body that will solely be responsible for urban development affairs across all sectors.
The lack of specificity and a clear objective to tackle urban poverty at a cross-ministerial level shows a degree of knowledge gap. Although it is known and highlighted that data and statistics are essential to guide the development process, this alone is inadequate. The national strategy does not suggest a comprehensive explicit path to resolve this issue.

URBAN PROFILE

Another document reviewed was the UN-Habitat, Gambia: National Urban Profile, 2011. The report discusses several challenges and here is a summary of the points noted.
The difficulties of the current land administration are numerous, for example, the master plans are out dated and people are not well sensitized with regard to land registration and land acquisition. Very little assistance if any is given to squatters on housing and transportation. The only assistance comes in the form of providing food and clothing when disasters occur. No housing survey has been carried out in slum areas, thus little information is obtained on the activities of slum dwellers. Due to lack of skills and knowledge, one of the major challenges which remains unaccomplished is the upgrading of the master plans and standards.
These issues cannot be addressed because the office responsible for this task, the Physical Planning and Housing Department, is currently seriously under staffed and has limited resources (UN Habitat, 2011, pp. 11-15).

Within the projects and programs lodged in the document, there is no mentioned vision to have an urban renewable project, an urban management and development project, or even a vision to create a body solely responsible for urban planning affairs.
The document also has parts that can be described as contradictory, as it points out the scarcity of data and how this affects development planning yet does not emphasize it as a core hindrance when stating the challenges for development. Likewise, this document also hints lack of data here and there, in sections such as urban health and urban education but finally does not mention "inadequate data" as an overarching challenge in itself.

RISK PROFILE

The UNDP with other development partners support the program CADRI - Capacity for Disaster Reduction Initiative. According to the risk profile of Gambia on the CADRI website the following issues were of importance to this research.
The Gambia is prone to frequent extreme weather events, droughts and floods. In 2013, 285.000 people were at risk of food insecurity and floods affected 3,300 people. This is due to the fact that there is lack of proper irrigation systems and poor land use practices, which lead to low agricultural productivity. In addition, poor coverage of sanitation and access to clean water are the main causes of water-borne diseases (diarrhea, cholera and meningitis). In terms of capacity assessment, one the priority areas for the Gambia's National Disaster Agency is risk identification, assessment and communication. Based on the recommendations of the Capacity Assessment report, in April 2012, the Government developed a National Plan of Action for Disaster Risk Reduction. However, due to high Government staff turnover, the validation of the National Plan is to take place this year - 2014.[27]
The case study of UNICEF-GIS, Rio exemplifies how risk identification and communication could be facilitated through their youth community-mapping project in Rio De Janeiro. The information mapped was disseminated instantly, the advantage of an online platform, and some of the minor risks identified were tackled without the need for a lengthy bureaucratic process.

[27] http://www.cadri.net/en/where-we-work/gambia

Moreover, the PAGE 2012-2015 strategy paper categorized the critical issues in disaster risk as the following: poor and inadequate settlement patterns, poor waste management systems, inadequate drainage systems, low awareness of the economic benefits of disaster risk reduction, inadequate capacity to address disaster issues at the local level, and inadequate early warning on impending hazards. The document went on to claim that a National Contingency Plan has been developed that focuses on effective preparedness and response to disaster through improving the urban planning and drainage management system, waste management, and shelter kits, to name a few. All designed to reduce the risk and vulnerabilities of communities.

However, the document also pointed out critical gaps and constraints. Clarifying that it is in terms of human capacity, low awareness of the economic benefits of disaster risk reduction, low resilience of infrastructure and facilities, inadequate slum upgrade, inadequate funding, lack of appropriate building codes and land use planning.

The goals and objectives of how to achieve this, again as with the previous chapters does not include or indication data collection as an integral part of the process or the formation of a central platform that will address urban planning issues, which as we have seen by now involves cross cutting issues. (Ministry of Finance and Economic Affairs, 2011, pp. 115-118)

It is unfortunate that a response was not received from the participants R7 and R8. They work with the institutions responsible for environmental issues and national disaster management. It would have interesting to have their views concerning the questionnaire to gauge awareness of participatory mapping practices and more importantly how they deem it could be useful for their institution relating to environmental and disaster risk planning.

FUNCTIONALITY

The overall aim of the questionnaire was to gauge if participatory mapping practices can be adopted in Gambia at an institutional level. The intention was not to assume this as a given, but rather to allow the institutions to specify if they feel as though it could be practical for them; and if so in what ways.

Based on the results represented in Table 1.8, Appendix 2, all of the respondents answer that it can be useful for their respective institutions. Then the subsequent

question were open- ended to allow respondents to identify in what ways it could be useful. According to R5, it could help in respect to physical planning constraints by enabling them "…to know and identify problems in the affected or study areas which would be helpful in upgrading facilities in each areas."

Whereas R2 expressed it will further enhance " The participatory nature of development planning…" in addition be useful for participatory methods included in "…. monitoring and evaluation, plus overall contribute to enhancing policy formulation."

Another example is given by R4 proposing that it can be used to " … better manage the road network at the planning and design stage and allocate resources accordingly...." furthermore it can also be "… a key tool to record accidents and identify critical locations in the road network." The respondent also gave a specific example related to their institution stating "Mobility mapping can be very useful for my institution as it will help us in better transport planning. You need to know who goes where, for what, when and how, to have good transport planning."

Meanwhile R1 expressed interest in possible projects of such nature saying, "It will help in the availability of data and would be a worthwhile project/ program for the bureau."

Despite most of them not having heard the term before they all seem to agree that it can be practical. All of the respondents give feedback that attest to the functionality of participatory mapping for their institutions. They not only confirm its usefulness by answering yes, but they also go forth by beginning to illustrate its applicability in relation to their respective institutions. These results clearly indicate two things. First the interest is there and second participatory mapping projects could serve a purpose if embarked upon by these institutions. In short it is adoptable.

To further strengthen the argument presented in this paper that lack of data is a hindrance for development planning especially urban planning; the 2013 report entitled, Building Sustainability in an Urbanizing World, expatiates on this.

The report is aimed at compiling data for the world's 100 largest urban areas and emphasizes how this is particularly important for policy development and evidence based learning in cities. It also cites that today there is better statistical data, for example on Fiji (population: 860,623) than there is for Lagos, Rio de Janeiro, Shanghai or Delhi, all of which have populations in excess of 10 million (Hoornweg & Freire, 2013, p. 1).

It also advocates that in order to promote and manage efficient service delivery, and sustainable development, clear and credible metrics for cities are essential.
In spite of that, most baseline statistical information is collected at the national level, whereas many important policy decisions are made and implemented at the local level. In short, credible and readily available data at the urban scale is needed to shape overall urban management (Hoornweg & Freire, 2013, pp. 1-3).

With a combination of all of the above findings, the premise of the research which is to see the potential of adopting participatory mapping as a data collection tool in Gambia is tackled. From the findings and analysis presented certain issues such as the lack of awareness, the financial constraints and other limitations were brought to light. In addition a further discussion on institutional capacity and knowledge gap amongst others were scrutinized. Revealing that the shortcomings in terms of capacity, finances, high environmental risk, and knowledge transfer justify the need for cost effective alternative data collection practices that are efficient and citizen-based.
All of the above points support my argument that there is a potential for the adoption of participatory mapping in the Gambia at an institutional level. The issues discussed further warrant the argument that not only is there great potential for its adoption; in addition it could be a valuable asset.

CONCLUSION

To conclude this study, I will begin by giving a brief recap of its trajectory. The introductory phase was to look at the profile of Gambia and lay some background about the country and why it was interesting to pursue this research for personal reasons, being that this is my home country and for academic reasons. To see what justified the country to be an interesting point of research when it comes to urban planning, data collection and the use of participatory mapping.

This was then followed by a literature review seeking to shed light on the underlying issue of mapping itself. Before one discusses participatory mapping, maps themselves and their relevance must be understood from a historical standpoint. The literature also touched upon the backstory of participatory mapping, how it emerged as a practice and where it stands today. In addition the different types of practices within this field, and its application as a tool in different contexts.

Participatory mapping is not fairly new, however it was essential to first conduct a theoretical research in this field to have a base knowledge. Most of the results were practical, as in handbooks, how-to guides for technicians and institutions wishing to engage in community mapping. In comparison, there is also an ample amount on community mapping for citizen empowerment and democracy. Thus, the initial findings were interesting but not specific enough to answer my research question. The scanty amount that was related to mapping for citizens' empowerment and data collection in urban areas became the most relevant.

To answer the first part of the research, which is - Can participatory mapping be used an alternative data collection tool? Two case studies were selected and presented in a separate chapter to address this. The UNICEF – GIS, Rio project and the Map Kibera Project were exemplified and do indeed prove that yes, participatory mapping practices can be harnessed for data collection purposes that could serve community development that in turn affects urban planning.

The methodology for this study employed a qualitative path to meet its two objectives. Firstly, to put forth cases where this tool was used for data collection in developing countries. Secondly, to have the perspectives of government institutions in the Gambia concerning the practice itself and its functionality related to their task as development practitioners. Thus, a combination of secondary and primary data was drawn upon. The secondary data, apart from the case studies, included national

development strategy papers, reports from the government and those from development agencies such as the World Bank/IMF and UNDP.

To answer the second question of the research – If participatory mapping could be used an alternative data collection tool. Also is there potential for it to be adopted at an institutional level in Gambia, for urban planning purposes; primary data collection technique was applied through a survey. A questionnaire was sent to 8 institutions. With this, an analysis was done whereby the findings were presented in themes: Awareness, Cost, and Knowledge Transfer. These themes were further expanded into subsequent categories such as Institutional Capacity, Urban profile, Functionality etc. for deeper analysis

The limitations of the research are also noted, as it is essential to understand in what way they affected the results. Despite these limitations, the findings however were still insightful and fruitful.

In regards to aim of the research, the first question as aforementioned, can participatory mapping be used an alternative data collection tool? The findings support the underlying argument here by illustrating two cases whereby this tool is utilized successfully to address, citizens empowered but most importantly the provision of essential data.

The main aim to determine its potential to be adopted at an institutional level in Gambia, for urban planning purposes is also tackled by the results presented. The outcome proves that in general there is a paucity of data in Gambia. This context qualifies that such a tool could be functional. More so, this fortifies my argument that there is a high potential for its adoptability at an institutional level and it would be something valuable to enhance the urban planning process.

In conclusion, it is recognized that the government is aware of the paucity of data and is putting an effort to enhance the availability and accessibility of data for development planning. As such, my final input is that participatory mapping should not be seen as the grand solution that would miraculously resolve this issue. It is a citizen or community based platform and so institutional issues like high staff attrition rate, low human and technological resources amongst other things will not directly impact the process itself. In fact it should be viewed as something that could be used as an alternative data collection technique where appropriate, with the aim of complimenting standard approaches that are working. With this mind, various cross cutting issues such as water supply, drainage systems, crime prevention and

community upgrading programs could then be analyzed by utilizing this tool to maximize the expected outputs.

Besides this, it is also important to put forth that the results have grounded the argument concerning its adoptability in Gambia. However, adoptability does not always translate into implementation. Yes it can be functional, but steps and measures have to taken to ensure its implementation and sustainability in the right manner that is suitable for the cause. Although noteworthy, this is beyond the scope of the research.

For this reason, it is beneficial to state that this research is done with the hope that it could serve as a background study; providing a clear picture of the context, concerning the lack of data in Gambia for urban planning purposes. The aim being to lay a foundation for further research on the topic which could be of interest for a PhD study, for the government institutions themselves or development agencies and non-governmental organizations. A field study could even be conducted to actually gather information on citizens' perspectives on participatory mapping. After all, citizens are the integral part of such mapping activities. Also this could include the perspectives of NGO's and other development agencies working in Gambia with regards to initiating such projects.

Another possibility to further this study could be to conduct research analyzing what the most pressing issues are at a given community and then to determine which type of mapping practice, for example paper mapping, ground mapping, open sourced/ crowd sourced mapping, or participatory –GIS; could be utilized and how the implementation could be initiated. With an initiated pilot mapping project information that could be gathered ranges from physical and social geography, household size/ income, demography, customary land boundaries, traditional natural resource management practices, sacred areas residents' personal / collective experiences, their attitudes / perspectives on their environment etc.

Nonetheless, the information captured here could be useful for all government institutions dealing with planning issues for example Department of Planning (Ministry of Finance & Economic Affairs), Policy Analysis Unit (Office of the President), Ministry of Local Government & Lands, the Bureau of Statistics, National Disaster Agency etc.

It is a good place to start by asserting that there is a paucity of data in Gambia, which affects baselines and planning processes. Without baseline data, the question

posed is how does one then know what realistic, measurable goals to aim for as part of development planning?

With development today taking on the trend of participation through citizen empowerment and involvement. Along with the chant “for the people, with the people, by the people” I would say participatory mapping is an asset that could go a long way to compliment urban planning processes in Gambia.

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Appendix 1

QUESTIONNAIRE

1. Have you heard of the term Participatory Mapping before? Yes / No

2. Do you know of any Participatory Mapping projects in the Gambia? Yes / No

If yes please specify briefly

a. Were there international partners in the project?

b. What motivated the decision to use Participatory Mapping?

c. When was it used, and for how long?

d. Are there publications or reports describing its implementation?

e. What kinds of success or failures were experienced"

f. Was the project mainstreamed?

3. Do you think a participatory mapping project/program could be useful for your institution? Yes/no

If no, briefly state the reason/s below

If yes specify in what way this could be useful for your institution?

4. Does your institution collaborate or share data with any of the following institutions?

MOFEA- Department of Planning GBOS

MOLGL- Department of Physical Planning MOWCI

5. Is this collaboration shared on a common platform? Yes / No

a. If yes, please specify

website ____ online database _____ other _____

6. How would you describe in general, the availability and accessibility of data related to housing, transport/road network, crime, community maps, zoning, etcetera in the Gambia?

7. If applicable, how much of your budget is dedicated to research: data collection / mapping activities?

Appendix 2

TABLES

TIMEFRAME			
1 week	2-4 weeks	4-8 weeks	No response
Respondent 1	Respondent 2	Respondents 3, 4, 5	Respondents 6, 7, 8

Table 1.1

Table 1.2 AWARENESS

	R1	R2	R3	R4	R5	R6, 7, 8
Yes		x			x	N/A
No	x		x	x		

Table 1.3 DISSEMINATION

	R1	R2	R3	R4	R5	R6, 7, 8
Yes					x	N/A
No	x	x	x	x		

Table 1.4 INSTITUTIONAL COLLABORATION

Institution	Collaborated Institution
DOP	GBOS, MOWCI, DPPH
GBOS	DOP
MoWCI	DOP, GBOS, NRA
NRA	MOWCI, DOP
DPPH	GBOS, DOP
NEA	

Table 1.5 DATA SHARING

	R1	R2	M3	R4	R5	R6, 7, 8,
Yes	x					N/A
No		x	x	x	x	

Table 1.6 COMMON PLATFORM

	R1	R2	R3	R4	R5	R6, 7, 8
Yes						N/A
No	x	x	x	x	x	

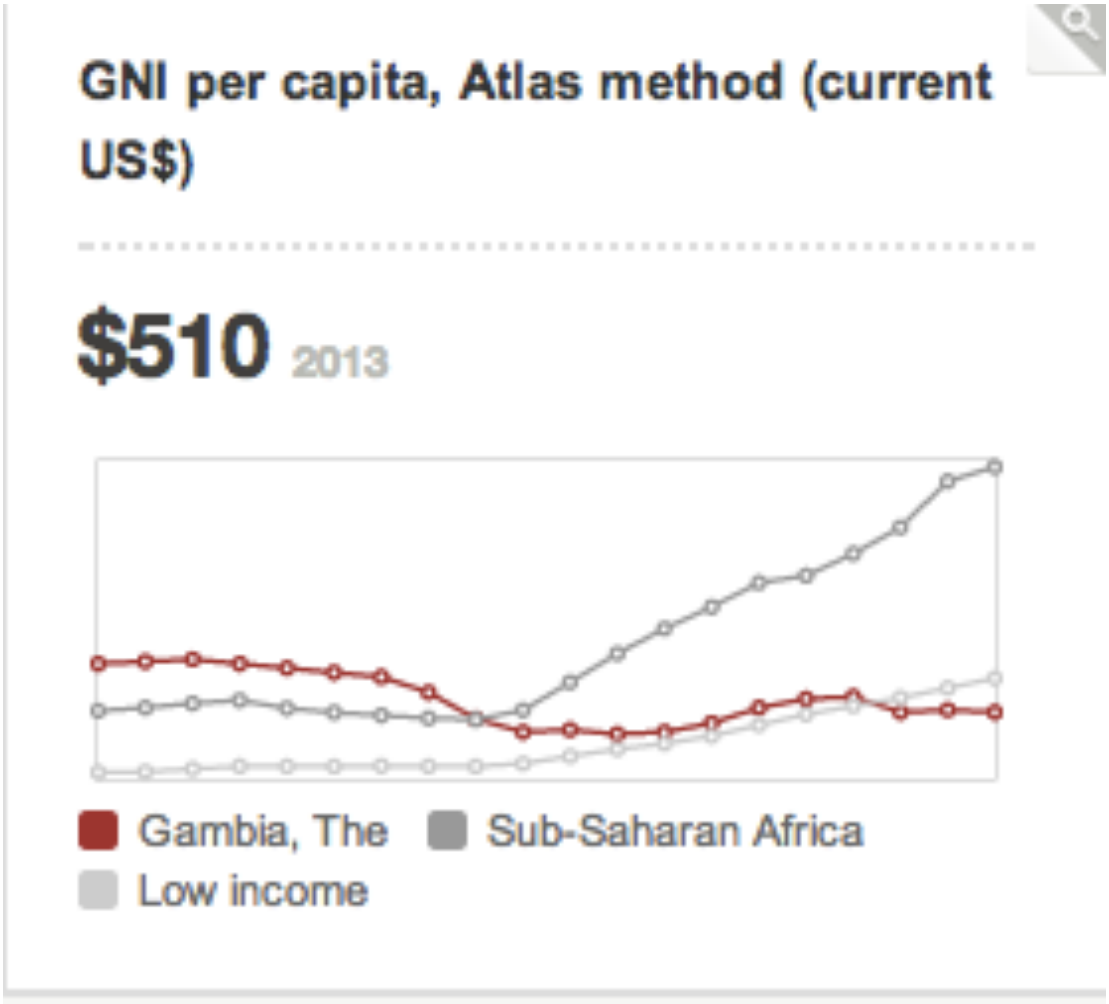
Table 1.7 BUDGET

R1	R2	R3	R4	R5	R6, 7, 8,
N/A	N/A	N/A	N/A	20%	N/A

Table 1.8 FUNCTIONALITY

	R1	R2	R3	R4	R5	R6, 7, 8
Yes	x	x	x	x	x	N/A
No						

Appendix 3


GNI per capita, Atlas method (current US$)
$510 2013
Gambia, The
Sub-Saharan Africa
Low income

Appendix 4

SECTORAL ALLOCATION FOR 2014 BUDGET

Departmental Development Budget (GLF)	D' Millions
Office of the President	90.80
Ministry of Basic & Secondary Education	346.62
Ministry of Health & Social Welfare	129.31
Ministry of Finance & Economic Affairs	50.78
Ministry of Transport, Works & Infrastructure	1,653.09
Ministry of Trade, Regional Integration and Employment	194.07
Ministry of Foreign Affairs	74.34
Ministry of Interior	0.00
Ministry of Agriculture	316.32
Ministry of Defence	50.91
Ministry of Fisheries & Water Resources	127.73
Ministry of Higher Education	168.26
Others*	79.24
Total	3,281.48

*Ministries not listed above